

TRANSACTIONS  
OF  
The Association of  
Life Insurance Medical Directors  
of America  
SIXTY-SECOND ANNUAL MEETING

James R. Gudger, M. D.  
*Editor*

VOL. XXXVII

PRESS OF  
Recording & Statistical Corporation  
New York City  
1954

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MEDICAL DIRECTORS OF AMERICA  
Printed in U. S. A.



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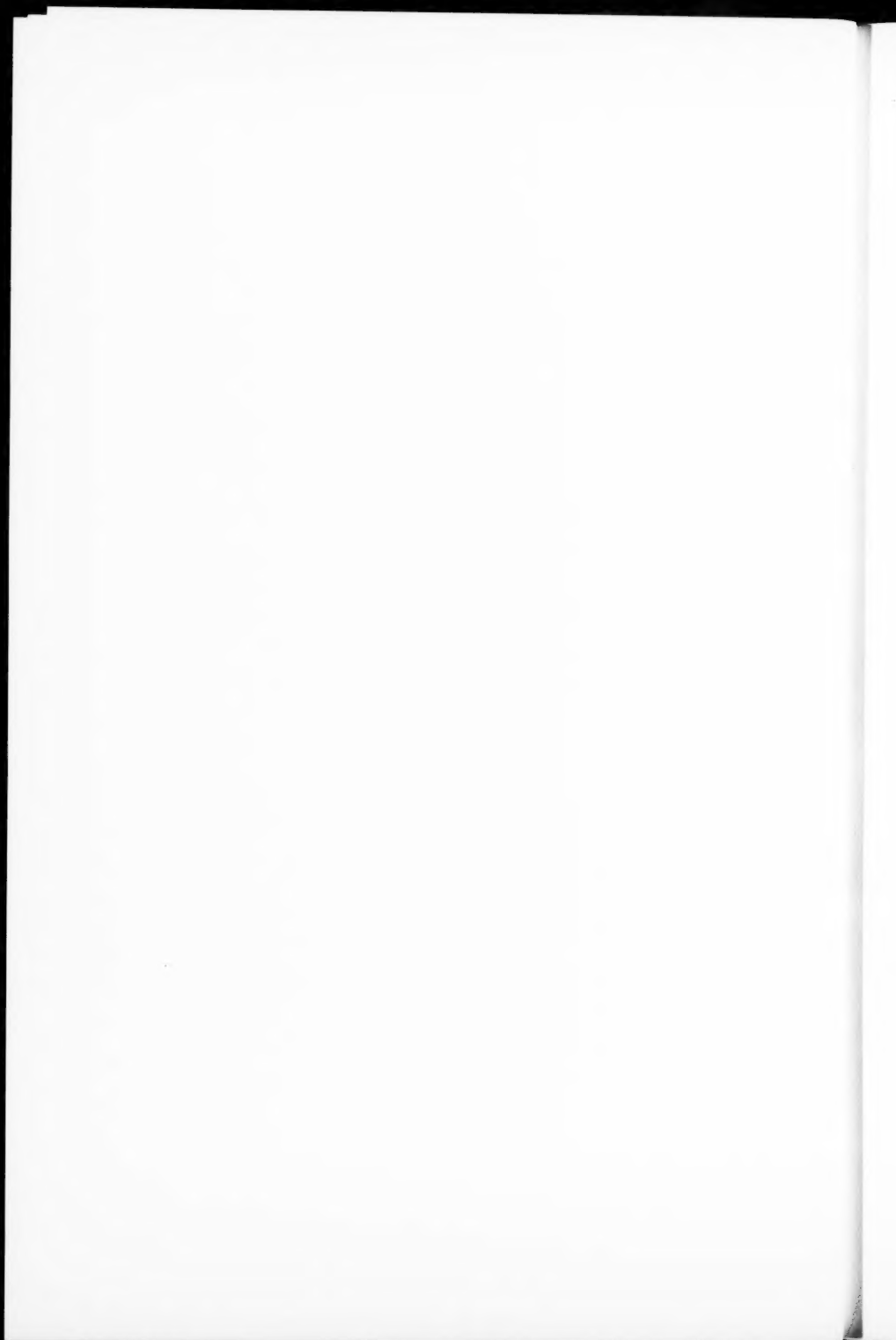
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# Transactions of The Association of Life Insurance Medical Directors of America

## SIXTY-SECOND ANNUAL MEETING

The Sixty-second Annual Meeting of The Association of Life Insurance Medical Directors of America was held at the Hotel Statler, New York on October 14, 15, and 16, 1953. Dr. Earl C. Bonnett, President of the Association, presided.

PRESIDENT BONNETT — Will the meeting please come to order?

It is a pleasure to welcome you here, both Association members and our guests. This is the sixty-second Annual Meeting and scientific session of the Association.

Following a good custom of many years' duration, Dr. Karl Anderson, Chairman of the Medical Section of the American Life Convention, is now invited to bring you greetings from that group.

DR. ANDERSON — Mr. President, Fellow-members and Guests: I am more than happy to have this opportunity to invite you all to the spring meeting of the Medical Section of the American Life Convention to be held on Mackinac Island, June 17, 18 and 19, 1954. It is a most delightful place; many of you have been there before, and those who have not been there surely have a treat coming.

Dr. John Boland is Golf Chairman, and Dr. Gordon Barnett is Tennis Chairman. Dr. Arthur Parks has been hard at work trying to develop a very interesting, informative program. We have a confirmation from Dr. Ancel Keys, Director, Laboratory of Physiological Hygiene, University of Minnesota, who will be one of the guest speakers. He will report on his study in European countries, comparing them to this country, on the problem of heart disease and diet. He will have just returned from a period of investigation so he should have some very in-

teresting data that will be of value to us. We are extremely fortunate in also having a confirmation from Dr. Kenneth A. Evelyn, Director, Institute of Biophysics, McGill University, Montreal, Quebec, who will talk to us on a very timely subject, "The Natural History and Prognosis of Hypertension". Dr. Henry B. Kirkland is going to be the moderator of a panel discussion on, "Chest Pain". These are merely examples of what I think will be an excellent program worked out by Dr. Parks.

It is a wonderful place to motor to — it will be spring, and there is nothing nicer than spring on Mackinac Island. It should be cool and comfortable. I am hoping that you will all take your families, and probably many of you will try to incorporate this trip into your family vacation. Please remember — the dates are June 17, 18 and 19. While the Convention starts on the 17th, we are hoping that most of you will be there and registered at least by the 16th so that we can start our program promptly at 9 o'clock on June 17.

PRESIDENT BONNETT — Thank you, Karl. That is a very tempting and gracious invitation.

As many of you know, we had hoped to present as part of our program the results of our efforts in the classification of risks as measured by an intercompany study of the resulting mortality. As June approached, it became apparent that the study was being delayed and that the material would not be available in time for this meeting. I am glad to tell you that it is expected to be published before the end of this year and can be secured at the low price of \$7.50 per copy. Of course, one free copy will go to each of the twenty-seven contributing companies.

With that mortality study to point up our achievements and failures in the past twenty-five years, we had planned to prognosticate on some of our remaining problems and those which we might face in the future. We were fortunate in being able to retain that part of our program and in having available Mr. Edward A. Lew, Actuary and Statistician of the Metropolitan Life Insurance Company, who is Secretary of the Committee on Mortality under Ordinary Life Insurances and Annuities, responsible for the intercompany study. Mr. Lew has undertaken to

present the changes in mortality among insured lives over the past twenty-five years and to explain some of the implications of those changes and the problems which they will leave to us and our successors.

Many of you recall the excellent papers given before this group by Dr. Louis Dublin, Statistician of the Metropolitan. Although you have met him before, I am very glad to introduce Mr. Lew as Dr. Dublin's very able successor who undoubtedly will meet with this group many times during his future career.

## SOME IMPLICATIONS OF RECENT CHANGES IN MORTALITY

EDWARD A. LEW

*Actuary and Statistician,*

*Metropolitan Life Insurance Company  
New York, New York*

For many years now we have witnessed a general reduction in death rates among insured lives. We have become so accustomed to this downward trend with its beneficial effects that we may be overlooking the new problems it has raised. This paper presents a few of the salient facts relating to the recent changes in mortality and discusses several of their more important implications for medical underwriting. In particular, it draws attention to the very low mortality rates currently being experienced at the younger ages and to the changed composition of death rates by cause, and takes up the advisability of modifying some of our underwriting practices in line with these developments.

### **Decline in Mortality between 1925 and 1950**

In considering the changes in death rates among persons insured under ordinary policies, the underwriter is especially interested in the mortality during the first ten or fifteen years following issue. This is because the effects of underwriting — and of medical selection in particular — are felt most strongly in the early years following issue, because at the longer durations it is often difficult to distinguish between the effects of underwriting and of secular changes in mortality, and because the experience under policies issued many years ago may reflect the results of underwriting methods which have been superseded.

Accordingly, we begin by examining the changes between 1925 and 1950 in the average rates of mortality\* among ordinary policyholders during the first fifteen years following the issue at ages 20,

\*The average rates of mortality for the years 1925 and 1950, referred to here and elsewhere in this paper, are the arithmetical averages of the individual mortality rates for the particular durations or the particular age ranges indicated, based on the mortality experience in 1925 and 1950, respectively.

35, and 50, respectively. Such mortality rates, based on the experience of the Metropolitan Life Insurance Company under standard ordinary policies, are presented in Chart 1. Comparison with the figures for a number of other large companies indicates that the Metropolitan's experience is reasonably representative for persons insured under standard ordinary policies.

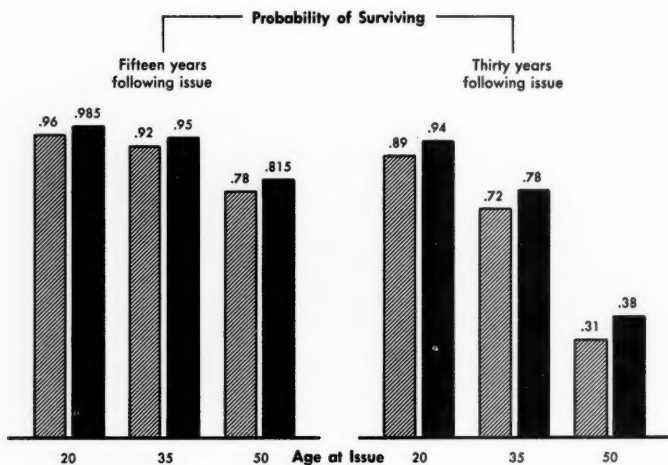
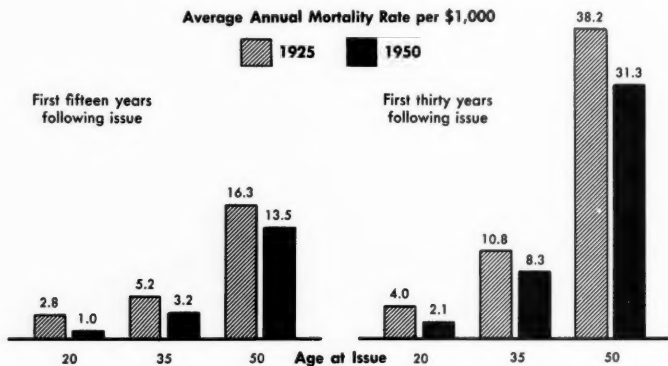
Chart 1 shows that mortality within the first fifteen years after issue declined 64 per cent for age 20 at issue, 38 per cent for age 35, and 17 per cent for age 50. The corresponding reductions in mortality for white males in the general population from 1925 to 1950, shown in Chart 2, were 56 per cent, 36 per cent, and 11 per cent, respectively. These data clearly illustrate the well-known fact that percentage-wise the decrease in mortality has been greatest at the younger ages and that it has diminished progressively with advance in age. The reductions in mortality were somewhat greater among ordinary policyholders than among white males in the general population. This may be attributable partly to an increasing proportion of females among persons insured under ordinary policies and partly to the effect of improved underwriting methods.

Chart 1 also shows the corresponding reductions in the average rates of mortality among ordinary policyholders during the first 30 years following issue, which amounted to 48 per cent for age 20 at issue, 23 per cent for age 35, and 18 per cent for age 50. For white males in the general population the respective declines were 43 per cent, 17 per cent and 13 per cent.

The over-all effect of these reductions in mortality among insured lives between 1925 and 1950 is reflected in the marked shift in the age distribution of deaths, as shown in Chart 3. In 1925, about 25 per cent of all deaths among persons insured under standard ordinary policies in the Metropolitan occurred at attained ages under 35; less than 40 per cent of the deaths occurred at attained ages 50 and over. If the age distribution of these insured persons had continued to be the same as in 1925, then with the mortality rates prevailing in 1950 the proportion of deaths at ages under 35 would have dropped to about 13 per cent and the proportion at ages 50 and over would have risen to a little over 60 per cent. This shift in the age distribution of

Chart 1

## Decline in Mortality of Standard Ordinary Insured Lives\*



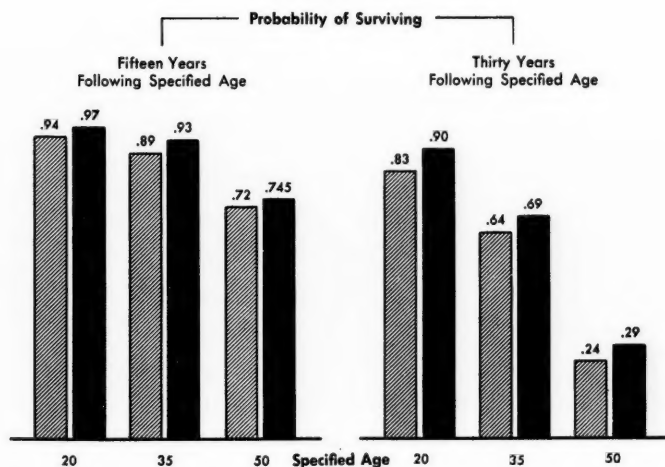
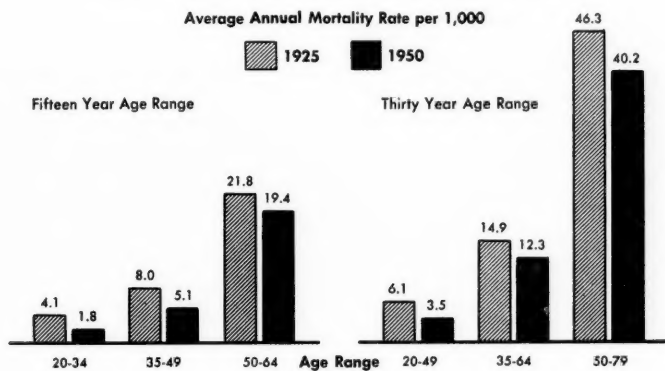
\*Based on experience of Metropolitan Life Insurance Company under standard ordinary policies

# RECENT CHANGES IN MORTALITY

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Chart 2

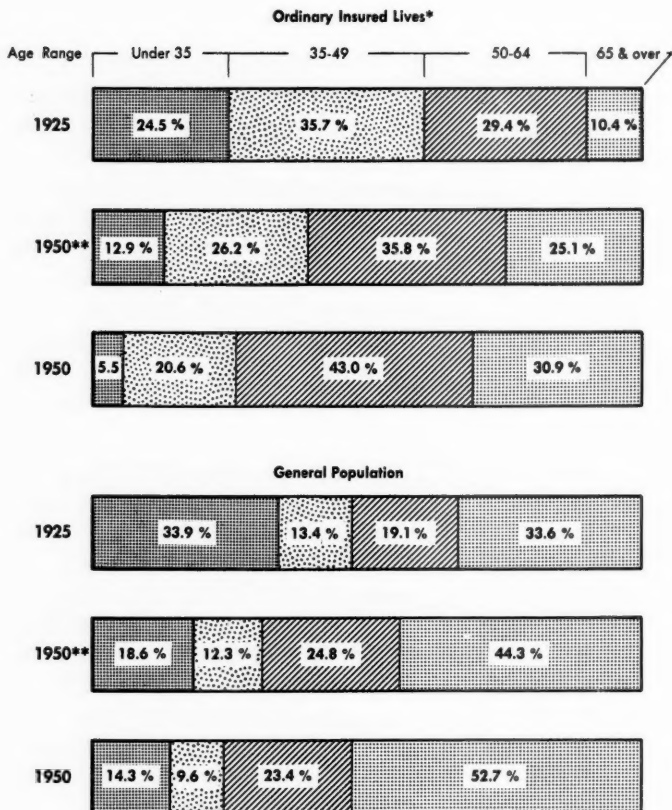
## Decline in Mortality of White Males in the General Population\*



\*1925 — Death Registration States of 1920  
1950 — Total U. S.

Chart 3

## Changes in Age Distribution of Deaths



\*Based on the experience of the Metropolitan Life Insurance Company under standard ordinary policies

\*\*Assuming same age distribution of insured lives as in 1925



deaths would have reflected solely the sharp decline in mortality at the younger ages and the lesser decrease at the older ages. However, because of the increase in the percentage of older persons among the Metropolitan's standard ordinary policyholders since 1925, the proportion of deaths actually reported in 1950 at attained ages under 35 was only a little above 5 per cent, compared with nearly 75 per cent at attained ages 50 and over.

The most noteworthy feature of the mortality trend during the past twenty-five years is the unprecedented low level to which death rates among persons insured under standard ordinary policies have been reduced. In the Metropolitan's 1950 experience among standard ordinary policyholders the average mortality rate during the first fifteen years following issue at age 20 was down to 1 per 1,000; at issue age 35 it was down to slightly more than 3 per 1,000; while at issue age 50 it had decreased to 13.5 per 1,000. Even during the first thirty years following issue at age 20, the average rate of mortality was only about 2 per 1,000. The latest published intercompany experience under standard ordinary policies showed practically identical low death rates.\*

With such low death rates, further reductions in mortality at the younger and middle ages, even if large percentagewise, can have relatively little effect on premium rates for life or endowment insurance.

To appreciate better the significance of these very low death rates, we might consider the proportions of persons surviving at least fifteen and at least thirty years under the mortality conditions of 1950. Chart 1 indicates that among ordinary policyholders at issue age 20, about 985 out of every 1,000 would survive fifteen years and that about 940 out of every 1,000 would survive thirty years. For age 35 at issue more than 950 out of every 1,000 would survive fifteen years. If the mortality rates experienced under standard ordinary policies in 1950 were increased by as much as 30 per cent, the proportions surviving fifteen years would decrease only from about .985 to about .980 at age 20, and from about .95 to about .935 at age 35. *No clinical follow-up study could be expected to distinguish between such small changes in the proportions surviving!* However, the medical

\*Transactions of the Society of Actuaries, 1952 Reports of Mortality and Morbidity Experience, pp. 1-33.

underwriter is in effect required to have an appreciation of such fine mortality differentials in determining which risks may be accepted for standard insurance at the younger and middle ages. The practicability of recognizing such small mortality differentials and the implications of trying to do so are discussed later on.

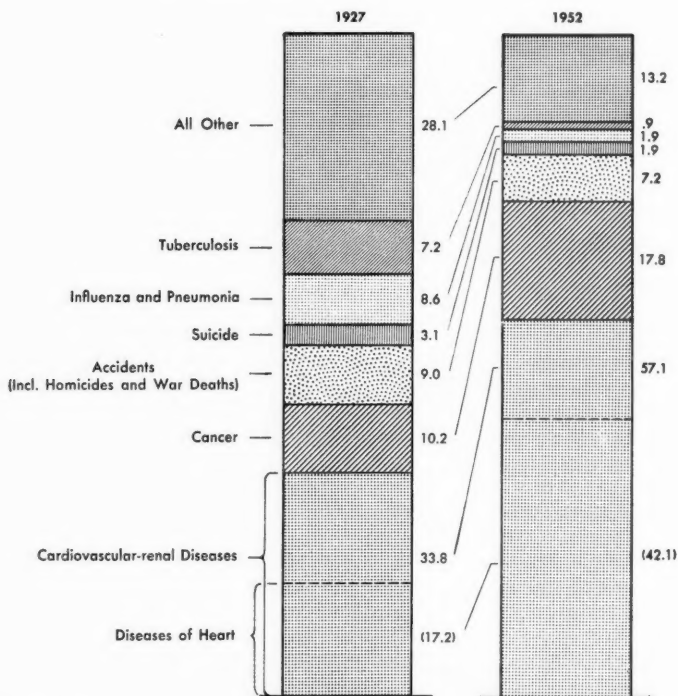
### Changes in Mortality by Cause between 1925 and 1950

Another notable feature of the decline in mortality during the past 25 years is the striking change in the relative importance of the various causes of death. This is illustrated in Chart 4.

Chart 4

Percent Distribution of Death Claim Payments\* by Cause

Ordinary Insurance



\* All Companies Reporting to Life Insurance Association of America

For the companies reporting to the Life Insurance Association of America (or the Institute of Life Insurance), cardiovascular-renal diseases accounted for 57 per cent of all ordinary insurance death claims paid in 1952, whereas in 1927 the corresponding proportion was less than 34 per cent. Much greater has been the relative increase in claim payments for deaths attributed to diseases of the heart, which rose from 17 per cent to over 42 per cent of the total. Almost as pronounced was the increase in the amounts paid on account of cancer, which rose from 10 per cent to nearly 18 per cent of the total. Thus, in 1952 the cardiovascular diseases and cancer were responsible for three-fourths of all the death claim disbursements on ordinary insurance. No other disease accounted for as much as 2 per cent of the total death claims, whereas twenty-five years ago — before the days of serums, sulfa drugs, and antibiotics — influenza and pneumonia were responsible for nearly 9 per cent and tuberculosis for more than 7 per cent of the claim payments. In 1952, the external causes of death — accidents including homicides, war deaths, and suicides — were responsible for 9 per cent, and all the other causes combined for 16 per cent of the total. Suicides were responsible for 1.9 per cent of the total claims, or for as much as influenza and pneumonia.

Among industrial policyholders and in the general population, the proportions of deaths due to cardiovascular-renal disease and cancer have also increased markedly. This trend among industrial policyholders and in the general population, as well as among ordinary policyholders, reflects not only the sharp reduction in mortality from acute infectious conditions, but also a higher proportion of persons at the older ages.

Accordingly, to obtain a better picture of what has happened to mortality by cause of death among ordinary policyholders, it is necessary to examine the changes in the composition of the death rates by cause for specific age ranges. The upper panel of Table A presents the estimated average rates of mortality from the more important causes of death during the first fifteen years following issue at ages 20, 35 and 50, based on distributions of deaths by cause on standard ordinary insurance developed in connection with intercompany investigations covering the experience about 1925 and 1950. It indicates that

- (1) At issue age 20, the cardiovascular-renal diseases accounted for about 25 per cent of the total mortality in 1950, or about double the proportion in 1925; cancer was responsible for 15 per cent of the total in 1950, as against 3 per cent in 1925; for accidents (including homicides and war deaths) the proportions were 45 and 28 per cent, respectively. Suicides were responsible for about 5 per cent of the deaths both in 1950 and in 1925.
- (2) At issue age 35, the cardiovascular-renal diseases, cancer and accidents were respectively 45 per cent, 17 per cent and 15 per cent of the total in 1950, as against 27 per cent, 8 per cent and 15 per cent in 1925. Suicides were about 6 per cent of the total death rate in both years.
- (3) At issue age 50, the proportion of the total death rate accounted for by cardiovascular-renal diseases rose in 1950 to nearly 60 per cent, as compared with 50 per cent in 1925. The corresponding figures were 21 and 14 per cent for cancer and 6 and 9 per cent for accidents.

The lower panel of Table A presents similar figures on mortality by cause during the thirty-year period following issue. Over this longer period the proportions of deaths due to cardiovascular-renal diseases and cancer were somewhat higher than during the first fifteen years for issue ages 35 and 50. On the other hand, the proportion of deaths due to accidents was lower at each age for the thirty-year than for the fifteen-year period.

Comparison of the 1925 and 1950 distributions by cause of death on ordinary insurance at issue ages 20, 35 and 50, makes it clear that the proportions of deaths due to cardiovascular-renal diseases and cancer have increased materially at all ages, but especially so at the younger ages. The data for 1950 indicate, however, that at the younger ages accidents are still the leading cause of death by a wide margin. The cardiovascular-renal diseases begin to account for about half the total mortality at issue age 35. At age 50, the cardiovascular-renal diseases and cancer combined are responsible for over 80 per cent of all deaths. At this age nearly half the total mortality is attributable to diseases of the heart and about 20 per cent to cancer.

To judge the significance of the markedly higher proportions of deaths from cardiovascular-renal diseases and cancer on ordinary insurance, it is necessary to consider also the trend of the actual death rates from these diseases. Although mortality from virtually all other causes of death declined sharply among ordinary policyholders, the death rates from the cardiovascular-renal diseases decreased only at ages under 35; in the age range from 35 to 50

Table A  
**Changes in Mortality by Cause Among Standard Ordinary Insured Lives\***  
**Estimated Annual Average Mortality Rate per \$1,000 during First 15 Years Following Issue**

Cause of Death	Age 20 of Issue		Age 35 of Issue		Age 50 of Issue	
	1925	1950	1925	1950	1925	1950
Cardiovascular-renal Diseases	.35	.25	1.40	1.45	8.00	8.00
Diseases of Heart	(.20)	(.15)	(.77)	(.21)	(4.30)	(6.55)
Cancer	.08	.15	.43	.54	2.32	2.81
Accidents (incl. Homicides and War Deaths)	.78	.45	.78	.49	1.54	.85
Suicide	.12	.06	.31	.20	.80	.37
Influenza and Pneumonia	.28	.01	.54	.04	1.37	.12
Tuberculosis	.43	.02	.54	.04	.56	.07
All Other	.76	.06	1.20	.44	1.71	1.28
Total	2.8	1.0	5.2	3.2	16.3	13.5
Cardiovascular-renal Diseases	.45	.50	3.10	4.15	20.00	20.00
Diseases of Heart	(.26)	(.39)	(1.64)	(3.44)	(10.10)	(16.00)
Cancer	.16	.32	1.02	1.37	5.77	5.83
Accidents (incl. Homicides and War Deaths)	.86	.70	1.26	.99	2.52	1.38
Suicide	.15	.13	.52	.43	1.38	.66
Influenza and Pneumonia	.35	.02	1.09	.08	2.87	.31
Tuberculosis	.85	.06	1.19	.19	1.34	.19
All Other	1.18	.37	2.62	1.09	4.32	2.93
Total	4.0	2.1	10.8	8.3	38.2	31.3

\*Based on distribution of deaths by cause on standard ordinary insurance developed in intercompany investigations.

mortality rates from this cause registered a moderate increase while at issue age 50 they showed no change, perhaps due to improved

selection of risks at the older ages. The death rates from diseases of the heart — which comprise the major portion of the cardiovascular-renal diseases — also decreased at ages under 35, but increased by more than 50 per cent at the middle and older ages. Cancer death rates rose appreciably at all ages, almost doubling at the younger ages and increasing by about 25 per cent at ages 35 and over.

The mortality rates from cardiovascular-renal diseases, diseases of the heart and cancer among white males in the general population have shown similar increases during the past twenty-five years, as is indicated in Table B.

However, of much greater import to the medical underwriter than the changes in mortality by cause during the past twenty-five years are the prospective mortality trends from these major causes of death.

#### **Prospective Mortality Trends from the Major Causes of Death**

The major components of the cardiovascular-renal disease group are diseases of the heart, intracranial lesions of vascular origin, and nephritis. Recorded death rates from intracranial lesions of vascular origin and from nephritis have both declined by more than 50 per cent during the past twenty-five years. On the other hand, mortality from diseases of the heart has shown a definite upward trend past middle life. Studies made by the Public Health Service\* indicate that, in the general population, death rates from diseases of the heart have since 1925 declined steadily in the age range 15-34, have remained unchanged in the age range 35-44, but have increased almost continuously at ages 45 and over. Among white males in the general population the increase in mortality from diseases of the heart manifested itself earlier — from about age 35 on. This is paralleled in the experience of ordinary policyholders.

Some of the increase in the recorded mortality from diseases of the heart at ages 35 and over may reflect improved diagnosis and better certification of causes of death, with a consequent transfer of deaths previously reported under other cardiovascular-renal conditions. However, most of the increase must be considered a

\*Statistical Studies of Heart Disease. II — Important Factors in Heart Disease Mortality Trends, by T. D. Woolsey and I. M. Moriyama. Public Health Reports, Sept. 24, 1948, and IX — Race and Sex Differences in the Trend of Mortality from the Major Cardiovascular-Renal Diseases, by T. D. Woolsey and I. M. Moriyama. Public Health Reports, March 23, 1951.

Table B  
Changes in Mortality by Cause Among White Males in General Population\*

Cause of Death	Average Annual Mortality Rate per 1,000					
	Age Range 20-34		Age Range 35-49		Age Range 50-64	
	1925	1950	1925	1950	1925	1950
Cardiovascular-renal Diseases						
Diseases of Heart	.44	.24	1.81	2.00	8.96	10.52
Cancer	(.27)	(.16)	(1.00)	(1.66)	(4.55)	(8.63)
Accidents (incl. Homicides and War Deaths)	.11	.15	.52	.63	2.62	3.20
Suicide	1.09	.85	1.30	.76	1.62	1.01
Influenza and Pneumonia	.15	.12	.30	.25	.49	.43
Tuberculosis	.37	.03	.85	.11	1.67	.36
All Other	.94	.13	1.19	.34	1.29	.69
Total	1.00	.28	2.03	1.01	5.15	3.19
	4.1	1.8	8.0	5.1	21.8	19.4
Cardiovascular-renal Diseases						
Diseases of Heart	1.06	1.07	4.50	5.59	17.02	18.74
Cancer	(.60)	(.87)	(2.34)	(4.60)	(8.15)	(14.35)
Accidents (incl. Homicides and War Deaths)	.29	.37	1.31	1.71	3.98	5.02
Suicide	1.19	.80	1.42	.87	1.89	1.29
Influenza and Pneumonia	.22	.18	.37	.33	.53	.46
Tuberculosis	.59	.07	1.16	.22	2.56	.66
All Other	1.05	.23	1.22	.49	1.34	.76
Total	1.7	.78	4.92	3.09	18.98	13.27
	6.1	3.5	14.9	12.3	46.3	40.2

\*1925 — Death Registration States of 1920  
1950 — Total Continental U. S.

true rise in the risk of dying from heart disease. This conclusion follows from the fact that during the past twenty-five years the death rate from cardiovascular-renal diseases has increased appreciably among white males at ages 35 and over; at the same time there appears to be no reason to discount all of the decreases in

mortality from nephritis and from intracranial lesions of vascular origin.

A better understanding of the upward trend in mortality from diseases of the heart may be obtained by examining the contrasting trends in the two broad categories of heart disease. The recorded mortality from coronary artery diseases, including angina pectoris, has risen steadily for at least two decades. Among white males at ages 35 and over insured under industrial policies in the Metropolitan Life Insurance Company the age-adjusted death rate from these causes has jumped from about .75 per 1,000 in 1930 to 3.2 per 1,000 in 1950. Some of this increase is undoubtedly spurious and represents merely the greater alertness of physicians in detecting and reporting coronary artery disease, as well as different practices in describing degenerative cardiovascular changes. It is difficult, however, to escape the conclusion that an appreciable part of the rise in mortality from coronary artery diseases is real, especially if we accept the recorded increase in mortality from all diseases of the heart and take account of the fact that mortality from diseases of the heart of infectious origin has declined.

Diseases of the heart of infectious origin are included in the broad category of chronic diseases of the heart other than of the coronary arteries. Among white males at ages 35 and over insured under industrial policies in the Metropolitan Life Insurance Company the age-adjusted death rate for this broad category declined from 4.5 per 1,000 in the period 1926-1930, to 3.3 per 1,000 in 1950. This decline reflects the marked gains that have been made in reducing death rates from rheumatic heart disease and from cardiovascular syphilis. Up to middle life the decline in mortality from the diseases in this broad category can be accounted for largely by the progress made against rheumatic fever. Much of the decline in mortality from the diseases in this broad category which has occurred in middle life is attributable to the reduction in the death rate from cardiovascular syphilis.

These trends in the mortality from different types of heart disease are confirmed by clinical experience. Thus, Dr. Paul D. White,\* in his study of the prevalence of various types of heart

\*Changes in Relative Prevalence of Various Types of Heart Disease in New England: Contrast between 1925 and 1950. Reprinted, with additions, from the *Journal of the American Medical Association*, May 23, 1953, vol. 152, pp. 303-304.



disease in New England, found that between 1925 and 1950 rheumatic heart disease dropped from 40 per cent of all cases to about half that proportion, while for syphilitic heart disease the reduction was three quarters. In contrast, coronary artery disease increased from about 20 to 45 per cent of all cases. Hypertensive disease continued to account for about a quarter of the total. Even though these figures may also to some extent reflect an older age distribution of cases in 1950, they bring out well the upward trend in coronary artery diseases and the downward trend in rheumatic and syphilitic heart diseases.

These mortality trends have important implications for the future. The gains made thus far in reducing the toll from heart disease have been limited largely to the conditions for which diagnostic procedures are most adequate and for which tested preventive and therapeutic measures are in use. As further progress is made in their prevention and treatment, these types of heart disease may be expected to play a diminishing role in the years to come. On the other hand, coronary artery disease, the etiology of which is obscure or unknown, and for which we do not have sufficient diagnostic tools, is likely to become an increasingly important factor in the mortality from heart disease. On balance, we must therefore allow for the possibility that death rates from diseases of the heart will continue rising among white males at ages 35 and over, at least in the immediate future.

There is a similar probability implicit in the mortality trends from cancer. Cancer death rates among white males in the general population and among ordinary policyholders have both increased during the past twenty-five years. By way of contrast the trend in cancer mortality among white females has been downward at ages over 25.

The main reason for the rise in the cancer death rate among white males lies in the very sharp increase in mortality from respiratory cancer. The death rate from this cause among white males has nearly doubled in the last ten years, after having registered a similar increase in the preceding decade. It is difficult to determine how much of this increase is real. The fact remains, however, that respiratory cancer is now a major component of the cancer death rate among white males and that it is increasing.

How much further the mortality rate from this cause will rise is a matter of conjecture, but we must allow for the possibility that cancer death rates will continue to increase among white males in the immediate future.

Little need be said with respect to the outlook for other diseases. The death rate from tuberculosis will undoubtedly continue its long-term decline and before long should be a very minor factor in the insurance experience. Further gains in the mortality from influenza and pneumonia cannot be forecast with as much certainty. On the other hand, the prospects are good that surgical conditions will take a decreasing death toll in the future as operative techniques and pre- and postoperative care improve still further.

The net result of these mortality trends by cause of death is likely to reduce further the chances of dying from the acute infectious diseases and to increase the probability of death from the chronic and degenerative diseases, especially the diseases of the heart and cancer. It is worth noting that between 1925 and 1950 the chances of a white man age 20 eventually dying from an acute infectious disease dropped from 13 in 100 to about 5 in 100, while the corresponding probability of dying from a chronic or degenerative disease increased from 75 in 100 to 87 in 100. These figures epitomize the preponderant weight of the chronic and degenerative diseases in today's mortality picture. Recent trends in the mortality from the major causes of death suggest that these diseases may become even more important in the immediate future.

#### **Trends in Applications Rated and Declined**

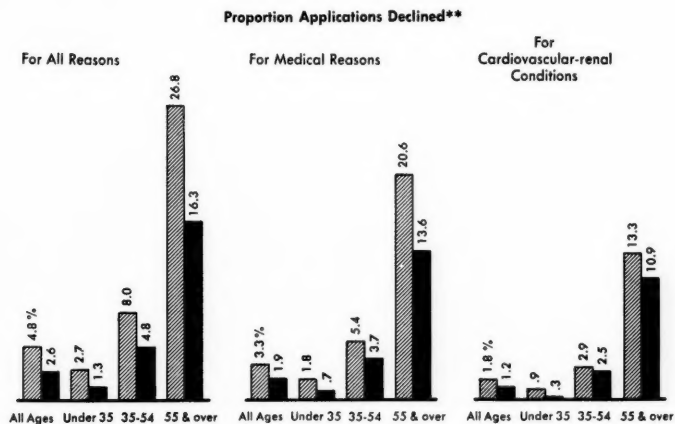
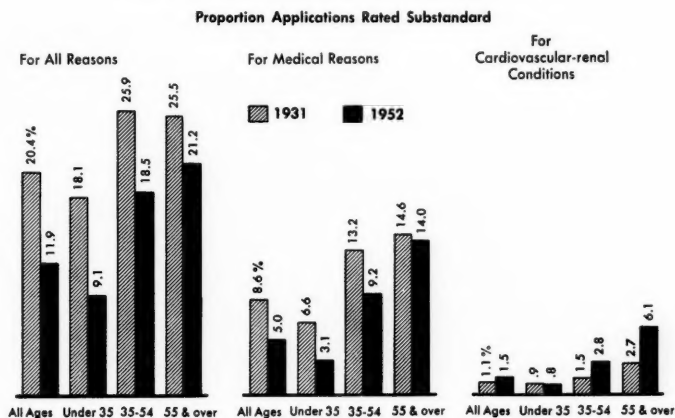
The effects of the much greater decline in mortality at the younger than at the older ages and of the increased importance of the cardiovascular-renal diseases in the mortality picture may also be seen in the trend of applications rated and declined.

Chart 5 presents the proportions of applications rated and declined (a) for all reasons, (b) for medical reasons, and (c) for cardiovascular-renal conditions, according to the Metropolitan Life Insurance Company's experience on ordinary insurance in 1931 and 1952.

For all ages combined, the proportions of applications rated for

Chart 5

## Trend of Cases Rated and Declined for Ordinary Insurance\*



\*Based on the experience of the Metropolitan Life Insurance Company

\*\*Not including applications postponed

all reasons and for medical reasons both declined more than 40 per cent between 1931 and 1952. These sizable reductions in the proportions of applications rated are attributable to the numerous liberalizations in medical impairment and other ratings. At ages under 35 the reductions were about 50 per cent and in the age range 35-54 about 30 per cent. However, at ages 55 and over the proportion of applications rated for all reasons decreased by as little as 17 per cent while the proportion rated for medical reasons declined only 4 per cent. Thus, corresponding to the greater improvement in mortality at the younger ages a better showing was made at these ages with respect to the proportion of applications rated.

The proportion of applications rated on account of the cardiovascular-renal conditions has shown little change at ages under 35, but has about doubled since 1931 at ages 35 and over. For all ages combined, the proportion of applications rated for cardiovascular-renal conditions increased over 35 per cent. To put it another way, whereas the proportion of applications rated for medical reasons accounted for 42 per cent of all applications rated both in 1931 and in 1952, the proportion of applications rated for cardiovascular-renal conditions increased in the Metropolitan from 5 per cent in 1931 to 12.5 per cent in 1952. In the age range 35-54 cardiovascular-renal conditions were responsible for some 15 per cent and at ages 55 and over for about 30 per cent of all applications rated by the Metropolitan in 1952. These figures unquestionably underestimate the importance of the cardiovascular-renal conditions as a cause of rating, because the Metropolitan issues a considerable volume of business on persons in substandard occupations. Thus, according to data compiled by the Institute of Life Insurance from reports of a large number of life insurance companies, it appears that the cardiovascular-renal conditions were typically responsible for about 25 per cent of all applications rated for ordinary insurance, or about twice the proportion observed in the Metropolitan.

Insofar as the Metropolitan's record of applications declined\* goes, between 1931 and 1952 the proportions declined for all reasons and for medical reasons both decreased about 45 per cent

\*Does not include applications postponed.

for all ages combined. These substantial decreases in the proportions of applications declined are attributable to liberalizations in medical impairment and other ratings and to extensions in the limits for substandard insurance from 250 to 500 per cent of standard mortality. The proportion of applications declined for all reasons at ages under 35 decreased by 50 per cent, and at ages 35 and over by 40 per cent. However, the proportion of applications declined for medical reasons at ages under 35 decreased 60 per cent, but at the older ages it decreased by only about 35 per cent.

Between 1931 and 1952, declinations on account of the cardiovascular-renal conditions decreased by about a third for all ages combined. At ages under 35 the reduction was about 65 per cent, but at ages 35 and over it was only about 15 per cent. However, as a proportion of all applications declined, the declinations attributed to the cardiovascular-renal conditions increased from 38 to 46 per cent. The current importance of the cardiovascular-renal conditions as a cause of declination is further brought out by the Metropolitan's 1952 experience which indicates that these conditions were responsible for nearly a quarter of the applications declined at ages under 35, more than half the applications declined in the age range 35-54, and two-thirds of those declined at ages 55 and over. These figures may understate somewhat the importance of cardiovascular-renal conditions as a cause of declination, because data recently released by the Institute of Life Insurance show that in a large number of life insurance companies cardiovascular-renal conditions were typically responsible for about 55 per cent of all applications declined for ordinary insurance, as against only 46 per cent in the Metropolitan.

### **Implications of Low Mortality Rates**

To determine whether a life insurance risk is acceptable for standard insurance with an underwriting limit drawn at 125 per cent of standard mortality, the medical underwriter is required to put his finger on all medical impairments or combinations thereof which it is expected will increase death rates by 30 per cent or more. This means that he must, in effect, be able to distinguish between risks who as a group are expected to experience death

rates equal to 130 per cent or more of standard mortality and those expected to be subject to standard mortality rates. To illustrate the fine appreciation of differences in death rates which is involved in drawing such distinctions under various levels of mortality among standard risks, we might consider the differences in death rates between standard risks and risks just beyond the limit for standard insurance in 1925 and in 1950.

In 1925, when the medical underwriter dealt with applicants aged 20, he had to differentiate under the then prevailing mortality conditions between persons expected to experience an average mortality rate of 3.65 or more per 1,000 over a fifteen year period following issue, and those expected to be subject to an average mortality rate of about 2.8 per 1,000 over the same period. Alternatively, the medical underwriter could have set for himself the objective of distinguishing between lives expected to experience an average mortality rate of 5.2 or more per 1,000 over a thirty year period following issue, and those expected to be subject to an average mortality rate of about 4.0 per 1,000 over the same period. When dealing with older applicants, he was called upon to make distinctions involving much wider mortality differentials.

Today, because the death rates among persons insured under standard ordinary policies have declined to very low levels, especially at the younger ages, the medical underwriter is required to make much finer distinctions in his evaluation of risks than he did twenty-five years ago. Thus, in the case of applicants aged 20, he must now differentiate clearly between lives expected to experience an average mortality rate of 1.3 or more per 1,000 over a fifteen year period following issue, and those expected to be subject to an average mortality rate of only about 1 per 1,000. Alternatively, his criterion may be to distinguish between lives expected to experience an average mortality rate of about 2.6 or more per 1,000 over a thirty year period following issue, and those expected to be subject to an average mortality rate of about 2 per 1,000 over the same period. For applicants aged 35, he may similarly have to distinguish between lives expected to experience an average mortality rate of 3.9 or more per 1,000 over a fifteen year period following issue, and those expected to be subject to an average mortality rate of about 3 per 1,000. In thus drawing

the line between standard and substandard risks the medical underwriter in effect makes much more refined prognoses for large groups of lives than are expected of the clinician with his far more intensive investigation of smaller numbers of individuals. It is high tribute to our medical underwriters that on the whole they have done so well in drawing the fine distinctions necessary under current mortality levels to underwrite borderline risks at the younger ages.

However, as mortality continues to decline, such fine distinctions in the evaluation of life insurance risks will become increasingly difficult to make. It is time, therefore, to re-examine the practicability and the good sense of trying to do so. More specifically, we might reconsider the advisability of continuing to draw the limit for standard insurance at 125 per cent of standard mortality, at least at the younger ages. In this connection, it is well to bear in mind that additional expenses are frequently involved in trying to make fine underwriting distinctions, and that such expenses may loom large in relation to the small extra premium required today to cover a 30 per cent mortality differential between standard and substandard at the younger ages. Furthermore, we might consider the difficulties that arise in our public relations when we have to explain to young applicants why substandard ratings have to be imposed for relatively minor physical impairments that increase mortality rates by only a fraction of a death per 1,000.

For these reasons it has been suggested that under current mortality levels the limit for standard insurance might with advantage be changed from a stated percentage of standard mortality, such as 125 per cent, to say 1 or 1.5 extra deaths per 1,000, at least at ages under 40. With such a dividing line for standard insurance, practically all young applicants with minor physical impairments would probably be acceptable at standard premium rates. Since minor impairments account for the great majority of all the physical impairments at the younger ages, the number of borderline risks under the proposed higher limit for standard insurance would in all likelihood be materially reduced. The decreased number of borderline risks and the simplification in underwriting procedures which a higher limit for standard insurance should make possible, could produce significant savings in under-

writing expenses. These savings would, of course, be an offset to the small increase in standard mortality brought about by the adoption of a higher limit. Because of the very low mortality currently being experienced under standard ordinary insurance at ages under 40, some small increase in standard mortality at these ages might not be altogether undesirable, especially if offset in part by savings in underwriting expenses and if also conducive to better public relations.

At ages 40 and over, the commonly used limit of 125 per cent for standard insurance appears to be reasonable on the whole. An argument can nevertheless be made for finer distinctions in the evaluation of risks at these ages. For one, it would not be difficult nor unduly expensive to make such distinctions, since medical examinations are the rule and more elaborate investigations of the risks are not infrequent at these ages. More important, because the death rates at ages 40 and over are still fairly high, any appreciable reduction in the mortality level would have a pronounced effect on the cost of standard insurance at these ages. There is little doubt, therefore, that if the limit for standard insurance was also changed at ages 40 and over from a stated percentage of standard mortality, such as 125 per cent to say 1.5 or even 2 extra deaths per 1,000, the cost of standard insurance at these ages would be lowered. The desirability of so tightening the limit for standard insurance at the older ages would have to be judged not merely by its effect on the cost of insurance but also on other grounds; for instance, the probable repercussions of more rated cases on the Company's clientele and agency force would have to be carefully considered.

A limit for standard insurance drawn at say 1, 1.5 or 2 extra deaths per 1,000 would of course require redefinition of substandard classifications in most companies. It would, however, fit in particularly well with a system of substandard classifications based on flat extra premiums.

The very low death rates now prevailing among ordinary policyholders at the younger ages also have a direct bearing on underwriting procedures. Since there is obviously a limit on the amount which may reasonably be spent on evaluation of risks in relation to a particular mortality level, the concomitance of declining mor-



tality rates and increasing underwriting costs suggests the advisability of more selective use of medical examinations, special tests, physicians' statements, and other underwriting procedures. To determine whether a particular test or procedure is warranted, its cost should be weighed against the mortality savings imputed to it under current mortality conditions. If mortality rates at the younger ages continue to decline and the upward trend of expenses is not reversed, it may become desirable to extend non-medical limits further, to experiment with non-medical underwriting of certain types of substandard risks, to simplify medical examinations on small amounts of insurance, and generally to seek more economical methods of underwriting risks at the younger ages. To put it another way, in view of the very low death rates at the younger ages, it may become increasingly worthwhile in many situations to rely on less intensive but more economical investigation of risks at these ages where relatively small amounts of insurance are involved.

#### **Implications of Changes in Mortality by Cause**

The changed composition of death rates by cause also has important implications for medical underwriting.

As previously noted, at age 20 accidents and suicides are currently responsible for 40 to 50 per cent of the average death rate during the first fifteen or even thirty years following issue, a higher proportion than twenty-five years ago. Within this period these two causes of death are, in fact, more important at this age than the cardiovascular-renal diseases and cancer combined. Such a composition of the death rate, as well as the low level of mortality rates and the small proportions of applications that are rated or declined at these ages, has made non-medical insurance so eminently practicable at ages under 40.

By way of contrast, the cardiovascular-renal diseases and cancer together account for about 65 per cent of the average death rate during the first fifteen or thirty years following issue at age 35. In other words, even at the middle ages the chronic and degenerative diseases today comprise the major portion of the mortality risk. At age 50 the cardiovascular-renal diseases and cancer are responsible for more than 80 per cent of the average death rate

during the first fifteen or thirty years following issue. Furthermore, in the age range 35-54, approximately one out of every ten applications received is rated and one out of every twenty-five is declined for medical reasons. The cardiovascular-renal conditions are responsible for about 30 per cent of the medically rated cases and for about 65 per cent of the applications declined for medical reasons. At ages 55 and over, about one out of every seven applications received is rated and about the same proportion is declined for medical reasons. The cardiovascular conditions are responsible for 45 per cent of the medically rated cases and for about 80 per cent of the applications declined for medical reasons.

The predominance of the cardiovascular-renal diseases and cancer in the mortality picture at the middle and older ages, and the importance of cardiovascular-renal conditions as a cause of rating and declination point to the advisability of orienting our medical underwriting increasingly toward these conditions.

The cardiovascular-renal diseases and cancer, or more broadly, the chronic and degenerative diseases as a group, present a larger problem today not only for clinical and preventive medicine, but also for life insurance medicine. Typically, these diseases have a slow and insidious onset with a long time frequently elapsing between the initiation of the disease process and the recognition of clinical symptoms. Many persons in the early stages of these diseases may have no symptoms at all or only such vague and mild symptoms that they do not seek medical care. Such symptoms are rarely admitted on examinations for life insurance. The medical underwriter is accordingly compelled to rely on the findings of the medical examination and on laboratory or other supplementary tests to a greater degree than the clinician.

Unfortunately, the usual type of medical examination for life insurance does not seem to be very selective for the cardiovascular-renal diseases and cancer. This is indicated by the fact that the death rates from the cardiovascular-renal diseases, and especially the diseases of the heart, have in recent years been only moderately lower among insured lives than in the general population. Greater emphasis on the cardiovascular-renal diseases in the medical examination for life insurance appears, therefore, to be in order. To make the examination more effective in detecting early poten-

tial victims of these diseases, it will probably be necessary to supplement the examination with new practical diagnostic tests.

The development of new practical diagnostic tests for the chronic and degenerative diseases offers a special challenge to life insurance medicine, which has the inspiring precedent of having fathered the best practical tests for albumin. Most important of all, however, life insurance companies have at their disposal extraordinary facilities for conducting experimental tests and for checking their validity. Then, too, life insurance medicine can first set for itself the easier task of developing practical screening tests with a reasonable tolerance for false negatives and false positives. It need not aim at a test which uncovers virtually every case of the suspected disease, but can rest with a procedure that simply identifies a high proportion of the suspected cases. The development and use of such tests in medical underwriting would not merely enable life insurance companies to be more scientific in their selection of risks, but would also make it possible for them to decline fewer applicants and to accept more at lower ratings.

PRESIDENT BONNETT — Thank you very much, Mr. Lew.

Are there any questions or any discussion from the floor? Mr. Lew has certainly outlined our problems. He has left with us the particular problem of heart disease very much in the foreground. This one divides itself into two phases, that of valvular heart disease resulting from rheumatic fever, and that of coronary artery disease. We shall approach them separately in order to bring to the forefront now the problem of systolic heart murmurs as it affects the insurance industry.

Dr. Henry B. Kirkland, Medical Director of The Prudential Insurance Company of America, has organized a panel discussion on "Systolic Heart Murmurs" using as a basis for his presentation the contributions of four Companies to the intercompany study. It is a pleasure to invite Dr. Kirkland and his fellow members of the panel to present their discussion and I am sure we shall all benefit by their observations.

## SYSTOLIC HEART MURMURS

### Panel Discussion

HENRY B. KIRKLAND, M. D., *Moderator*

*Medical Director, The Prudential Insurance Company of America  
Newark, New Jersey*

EDSON E. GETMAN, M. D.

*Medical Director, New York Life Insurance Company  
New York, New York*

K. JEFFERSON THOMSON, M. D.

*Assistant Medical Director, Metropolitan Life Insurance Company  
New York, New York*

HARRY E. UNGERLEIDER, M. D.

*Director of Medical Research, The Equitable Life Assurance  
Society of the United States  
New York, New York*

DR. KIRKLAND—We are going to endeavor to present certain pertinent features of the experience of four companies with the impairment of apical systolic murmurs. The figures used are those of the current impairment study, which will be available shortly, but the conclusions to be drawn will be limited to the material forthcoming from this group of cases from four companies. As you will see in the first table, this material is quite large. It may be pertinent to note that the number exposed to risk represents experience years, that is, the sum of the number of individuals involved multiplied by the years each has held his policy. Deaths are policy deaths, but multiple policies are in such small percentage as to be disregarded.

Finally, in introduction, it is essential to bear in mind that earlier intercompany investigations were based on a higher level of death rates than the current study. This means, in comparing results, that similar mortality ratios in a given classification imply substantially lower *actual mortality rates* now than before.

TABLE I

Apex murmurs, systolic, without known hypertrophy.

1. Localized, constant, non-organic
2. Transmitted, organic, no history
- 3 RF Ditto, rheumatic fever history
- 3 OTHER Ditto, other etiological factor
4. Localized, inconstant, non-organic

	ENTRANTS		EXPOSED
	MALE	FEMALE	TO RISK
1	4,938	1,089	40,103
2	9,167	3,139	84,611
3 RF	972	276	8,108
3 OTHER	2,489	788	22,004
4	3,601	503	30,764
TOTAL	21,167	5,795 (26,962)	185,590

What steps lead up to the appearance of a heart murmur in a given category? Broadly speaking, there is the report of the examining physician, the medical underwriting, influenced in varying degree by rules and judgment, and coding. Of these variants, we feel that the first can be largely disregarded. The four companies have very large numbers of examiners in all parts of the country. It is reasonable to assume that there is little if any difference in the average caliber of the source material, that is, the description of the murmur that appears on the heart chart. We shall, however, discuss in as much detail as possible the impact of underwriting techniques and coding practices on final classification as this provides figures for a mortality investigation.

We shall take up our five categories separately, making relevant comments on what we consider the most important features. It is to be observed that the number of deaths in many classifications are so small as to justify no conclusions whatever.

TABLE II

Apex murmur, systolic, constant, not transmitted, without known hypertrophy and without significant etiological background, by age at issue.

## MORTALITY RATIOS (Deaths Subscripted)

	AGES	EQ	MET	NYL	PRUD	4 CO'S
	15-29		198	80	294	183
			16	2	10	36
	30-39	125	212	84	140	143
		19	15	3	9	38
	40-49		145	84	126	130
			16	9	10	52
	50-64	122		128	120	114
		24	9	13	7	36
Total	<hr/> 15-64	<hr/> 123	<hr/> 172	<hr/> 100	<hr/> 153	<hr/> 137
		43	56	27	36	162

The first group comprises the apex murmur, systolic, constant, not transmitted, without known hypertrophy, and without significant etiological background. This table is by age at issue. In this and other tables, four-company totals are correct. In some instances, however, individual company figures are omitted.

Dr. Getman, although the number of deaths is small, the New York Life experience is extremely favorable here. How do you account for this?

DR. GETMAN — It is difficult to ascribe any particular reason for this; however, there might very well be at least two factors involved. It is my understanding that the New York Life underwriting procedures vary somewhat from the other companies on this panel. In the New York Life all heart murmurs are referred to a medical man for underwriting. Thus medical knowledge enters the picture and cases are underwritten with, we feel, more discrimination than can be hoped for with lay underwriters. It is interesting to note that just prior to 1935, the New York Life discovered that in these so-called functional or non-organic mur-

murs a rather unfavorable mortality was being experienced. Therefore, at that time, coinciding somewhat with this impairment study, we consciously became more conservative in our underwriting practices in relation to this type of murmur.

There is another factor which might be given some consideration also and that is the matter of coding. All coding is done in our Company by medical men at the time the case is underwritten. In this way perhaps a more accurate classification of these murmurs may also be obtained.

DR. KIRKLAND — Dr. Getman, you have touched in detail on underwriting and coding practices. Don't your remarks apply to all the murmurs we are discussing today?

DR. GETMAN — Yes, very definitely!

DR. KIRKLAND — Dr. Ungerleider, the Equitable did well here, too. Is your explanation similar to Dr. Getman's?

DR. UNGERLEIDER — I think Dr. Getman has touched on the vital part of our presentation — namely professional handling and proper coding. These cannot be stressed too strongly. I think some reference should be made to the collection of this source material, that is, the heart examination form. If the heart chart is so constructed that the physician will realize that what is wanted is an accurate clinical description of what he sees and hears, he will be motivated to give a better description of the condition. On the other hand, if the chart is so constructed that it requires him to give more attention to the mechanics of the chart than to a description of the impairment, then your information will be geared to this mechanical requirement. Give a physician enough space on your form to describe the impairment and ask questions which will direct and lead him to give you the information you require for your underwriting purposes, and you will observe better results.

DR. KIRKLAND — Dr. Thomson, the Metropolitan and the Prudential did not do too well. What comments do you have?

DR. THOMSON — There are two factors other than underwriting and coding which may be of significance. The distribution of exposures in the various age groups may be a factor. Though these figures are not shown in the tables, New York Life had roughly

one-third of its total exposures in the 15-29 year age group, the Equitable between one-third and one-half, the Prudential about one-half and the Metropolitan over one-half. Since it is known that there is an increased mortality in the younger age groups, distribution of experience may be a factor in the inter-company differences. This is no doubt due to the fact that there are individuals included in this category, particularly at younger ages, with rheumatic cardiac disease.

If one examines the entrants in this category, the ratio of males to females differs widely in the various companies; for example, in the Equitable experience it was 7:1, in the New York Life it was 6:1, in the Prudential 5:1, in the Metropolitan 3:1. The analysis of deaths does not indicate that the females contributed more than their share; the Metropolitan's large number of females may be important in that it may represent some unusual circumstance of selection which might have a bearing on mortality experience.

DR. KIRKLAND — In the Prudential cases, under age 30, seven of the ten deaths were caused by heart disease against an expected 0.4. This can hardly be other than significant, even in so small a sample.

Leaving aside for the moment the wide variation in company results, we have a high composite ratio for ages 15 to 29 as compared with other ages. There was a total of 36 deaths, not many, but enough to show a trend.

Dr. Thomson touched on this, but do you have any further explanation, Dr. Getman?

DR. GETMAN — There are several factors which may enter into this. First of all is the high number of entrants in this age group, the period when rheumatic fever is common. Then, too, a murmur described as a localized apical systolic may very well have been evidence of an early rheumatic infection. Also, there is the perfectly logical assumption that in many of these cases at the younger ages, subsequent infections have occurred accounting for this high mortality. However, it is interesting to note that in the New York Life material in this category no deaths from heart disease occurred below age 30.



DR. KIRKLAND — The older the applicant is at issue, the better is the experience with him in this group.

DR. UNGERLEIDER, does the Equitable underwriting practice reflect this trend, or do your debits increase as age advances?

DR. UNGERLEIDER — We have a contrary experience to that described by Dr. Getman. As regards the last two statements, 75 per cent of the excess mortality from diseases of the heart was experienced at issue ages under 30, secondly our mortality showed practically the same in the older ages. This bears out the clinical observations of several authors who have reported their experiences recently in the literature.

Nevertheless, we do increase our debits with advancing years because it is well known that murmurs appearing in middle or older life are not due to infections but rather to degenerative processes.

TABLE III

Apex murmur, systolic, constant, not transmitted, without known hypertrophy and without significant etiological background, by policy years.

MORTALITY RATIOS (Deaths Subscripted)						
YEARS	EQ	MET	NYL	PRUD	4 CO'S	
1-2			198	216	157	
		8	7	7	28	
3-5	70	183	99	171	124	
	11	18	7	10	40	
6-10	127	188	107	136	141	
	16	25	12	13	66	
11-15	243		19	122	133	
	16	5	1	6	28	
<hr/>						
Total	1-15	123	172	100	153	137
		43	56	27	36	162

DR. KIRKLAND — Table III is based on policy years. It is to be noted that the format is identical. Mortality seems excessive in

the first two years, but there are so few deaths that no worthwhile conclusions can be drawn.

Dr. Ungerleider, the Equitable mortality ratio was quite high in the 11th to 15th policy years, with 16 deaths. The other companies had very few deaths, but your experience seems to merit comment.

DR. UNGERLEIDER — That is to be expected, if by accident or design this result is obtained. A simple non-transmitted systolic murmur should have relatively little importance both clinically and from an underwriting standpoint. The murmur, as I indicated previously, becomes more important as age advances. In the material there must have been included significant heart disease which increases in severity as years advance, with a consequent increase in mortality. However, we had what should be mentioned here — a complicating feature, in that our experience showed ten deaths from cancer, and it is reasonable to suppose that these occurred in the latter years of experience.

TABLE IV

Apex murmur, systolic, inconstant, not transmitted, without known hypertrophy and without relevant history, by age at issue.

## MORTALITY RATIOS (Deaths Subscripted)

	AGES	EQ	MET	NYL	PRUD	4 CO'S
	15-29			69 1	104 5	92 14
	30-39			146 3	49 5	82 20
	40-49	245 15	133 12	81 3	115 12	143 42
	50-64			113 3	73 3	121 24
Total	15-64	142 28	125 37	101 10	85 25	113 100

DR. KIRKLAND—The next category involves the inconstant murmurs, systolic, not transmitted, without hypertrophy and without relevant history. It is to be borne in mind that two types of cases are so classified in insurance practice, murmurs heard only in certain positions on a single examination, and murmurs heard by only one of two or more examiners. Here the figures are very favorable, for the most part.

Dr. Ungerleider, would you comment on the high Equitable ratio at ages 40 to 49? Were most of these 15 deaths due to heart disease?

DR. UNGERLEIDER—This again bears out the importance of significant heart disease in people with murmurs at this age. For example, there were 10 deaths from heart and circulatory against only 2.11 expected. The relative mortality from circulatory diseases, therefore, was 474 per cent compared with 249 per cent for all causes.

TABLE V

Apex murmur, systolic, inconstant, not transmitted, without known hypertrophy and without relevant history, by policy years.

## MORTALITY RATIOS (Deaths Subscripted)

	YEARS	EQ	MET	NYL	PRUD	4 CO'S
	1-2			221	140	186
				3	5	21
	3-5	197	138	38	76	103
		15	10	1	5	22
	6-10		125	134	76	107
			15	6	9	39
	11-15	107			80	92
		13			6	18
Total	1-15	142	125	101	85	113
		28	37	10	25	10

DR. KIRKLAND—In Table V is shown the same category by policy years. One point needs re-emphasis—the high mortality ratio in the first two policy years.

Dr. Thomson, do you not think that the explanation applied to the constant group is also valid here?

DR. THOMSON — Yes. In looking over our fatal cases, it was obvious that definite instances of rheumatic heart disease had been included in this category in the younger age groups, and degenerative heart disease in the older age groups.

TABLE VI

Apex murmur, systolic, constant, transmitted to the left, and/or mitral regurgitation, without known hypertrophy and without significant etiology, by age at issue.

## MORTALITY RATIOS (Deaths Subscripted)

	AGES	EQ	MET	NYL	PRUD	4 CO'S
	15-29	548	360	199	318	337
		23	78	17	31	149
	30-39	293	264	178	218	238
		23	56	18	38	135
	40-49	138	238	173	227	204
		18	73	34	48	173
	50-64	145	187	135	95	146
		19	29	21	9	78
Total	15-64	217	265	167	218	224
		83	236	90	126	535

DR. KIRKLAND — The next group is the apical systolic murmur, constant, transmitted to the left and/or mitral regurgitation, without known hypertrophy and without significant etiology. The categories are all much larger here. The mortality ratios are much higher. There is the same downward trend with increasing age at issue.

Dr. Thomson, I think you told me that you had some interesting data on cause of death. Your entrants were very numerous, and you had a large number of deaths. Will you tell us about this?

DR. THOMSON — Of the 236 deaths in this category in the Metropolitan experience, Dr. Dietrich and I reviewed all the

records available, or 161. So far as could be determined, they were fairly representative of the entire group. Of these 161 deaths according to age at issue, 40 were in the 15-29 age group, 44 in the 30-39 age group, 56 in the 40-49 age group, and 21 were over 50 years of age. The cause of death and the nature of the underlying heart disease, when present, were determined as accurately as possible from the death claims or death certificate. In about one-third of the cases, it was not clear what the cause of death was.

Rheumatic heart disease was the underlying cause of death in 40 per cent at ages 15-29, in 25 per cent at ages 30-39, in 30 per cent at ages 40-49, and in 20 per cent of those over 50. In contrast, arteriosclerotic heart disease was responsible for deaths in only 10 per cent at ages 15-29, in 16 per cent at ages 30-39, 20 per cent at ages 40-49, and 38 per cent at 50 or more.

The actual causes of the cardiac deaths in general reflected the underlying disease, i.e., 12 per cent of the deaths in the age 15-29 group were due to congestive heart failure, 35 per cent in the 30-39 group, 16 per cent in the 40-49 group, and 10 per cent in the group over 50 years of age. Coronary deaths showed the reverse trend with only 10 per cent at 15-29, 11 per cent at 30-39, 20 per cent at 40-49, and 30 per cent in the group age 50 or more. Deaths from bacterial endocarditis are of interest. There were 12 in all, over one-half occurred in the 15-29 group and one-fourth in the 30-39 group; only one-fourth occurring after age 40.

The overall cardiac mortality in each group by age at issue was 60 per cent; this of course means that the excess cardiac mortality was concentrated primarily in the younger ages.

It seems obvious from these data that many individuals with a constant, apical systolic murmur transmitted or mitral regurgitation without known hypertrophy or etiology actually had heart disease of a significant degree when insured; in the younger age groups it was predominantly rheumatic; in the older ages mostly degenerative. Examination of these cases by experienced and well-trained examiners should have identified most of the younger individuals with rheumatic heart disease. In this regard it should be pointed out that in most instances the policy amounts were small and unless there was some doubt about the heart findings as

described, or other contrary information, the data from the original examination were used for underwriting the case.

In terms of years of policy issue in cases where it was possible to determine the cause of death, 9 of 14 deaths in the first two years of issue were cardiovascular, three were due to subacute bacterial endocarditis, one to acute rheumatic fever, four to coronary accidents, and one to cerebral embolus. On the same basis the 3rd-5th policy year deaths numbered 36; of these twenty were cardiovascular, six were due to subacute bacterial endocarditis, seven to congestive heart failure, five to acute coronary accidents, and two to cerebral embolization presumably associated with underlying mitral stenosis.

DR. KIRKLAND — Dr. Getman, as in the previous groups, the New York Life had the best results. Do you have any further remarks?

DR. GETMAN — Very few, since to speak further would only mean repetition, as we are all agreed that medical underwriting plays a leading role in proper murmur selection. However, our material agrees substantially with Dr. Thomson's in that at the younger ages a high percentage of deaths will be caused by rheumatic heart disease and very few by coronary. For instance, in the heart deaths in the 15-29 group, three out of four died cardiac deaths due to subacute bacterial endocarditis, cardiac failure, etc. However, the reverse is true in the 50-60 age group wherein three deaths occurred and all were due to coronary disease. These were all within the first two policy durations. Again I would like to point out that these groups are so small that no definite conclusions can be drawn from them. However, they are interesting and seem to reflect the Metropolitan's experience.

DR. KIRKLAND — Dr. Ungerleider, would you care to comment on the high ratio at the younger ages?

DR. UNGERLEIDER — Obviously we are dealing here with frank and significant heart disease — three of us experience a rather unfavorable mortality, greatly in excess of our ratings. You will note that this category is without known hypertrophy or not known to have had an x-ray or fluoroscopy. This points up the need for emphasis on this important physical sign. True hypertrophy, per se, is only a matter of a few millimeters, and enlarge-

ment usually does not occur until we have certain elements of dilatation. We would do well to emphasize to our examiners the importance of estimating heart size.

DR. KIRKLAND — The Prudential figures bring out a very important point touched on in the introduction. As compared with the 1929 Impairment Study, the mortality ratio on these organic murmurs under age 30 has risen, but the *actual* death rate has gone down drastically. This is due, of course, to the decrease in expected deaths, which is most pronounced at these young ages.

Dr. Thomson, do the Metropolitan figures yield similar results?

DR. THOMSON — Yes, they do.

DR. KIRKLAND — It can readily be seen that a discussion of these ratios is a very complicated affair. There are many inconclusive and unexplained aspects. About the best that can be done is to point up the main spots of interest, and we will therefore proceed to the next two categories.

The next group is broken down by associated antecedent infection. Table VII shows systolic murmurs, apical, transmitted, without known hypertrophy, but with a history of *rheumatism* or *chorea*. There are only 56 deaths.

TABLE VII

Apex murmur, systolic, constant, transmitted to the left, and/or mitral regurgitation, without known hypertrophy, but with a history of rheumatism or chorea, by age at issue.

MORTALITY RATIOS (Deaths Subscripted)						
AGES	EQ	MET	NYL	PRUD	4 CO'S	
15-29	709					444
	10					19
30-39	295					262
	10					16
40-49						237
						15
50-64						171
						6
Total	15-64	245	336	370	175	277
		28	22	4	2	56

Table VIII shows the same murmur, but with a history of some streptococcal infection and *without* a history of rheumatism or chorea. This group is larger numerically than the other, but total deaths in both are less than 200. There seems little to be gained by more than cursory consideration of these categories.

TABLE VIII

Apex murmur, systolic, constant, transmitted to the left, and/or mitral regurgitation, without known hypertrophy, but with a history of some other streptococcal infection and *without* a history of rheumatism or chorea, by age at issue.

## MORTALITY RATIOS (Deaths Subscripted)

AGES	EQ	MET	NYL	PRUD	4 CO'S
15-29		251	375	559	349
		14	18	8	45
30-39	357	308	348	126	294
	12	14	20	3	44
40-49		424	196	148	277
		18	14	3	44
50-64	282		121	83	95
	10		4	1	7
Total	<hr/> 15-64	<hr/> 319	<hr/> 290	<hr/> 267	<hr/> 213
		22	47	56	15
					140

Dr. Getman, Table IX shows a preponderance of other streptococcal association over rheumatic fever in the figures of three companies. There is an advantage to acting as moderator: I can ask you first why this is?

DR. GETMAN — I must say we were a bit startled when we saw these figures. We were curious as to just how they were evolved. A bit of investigation in our own Company revealed the fact that our Statistical Department had placed in the rheumatic fever group only those cards with a coding of rheumatic fever or chorea in addition to the murmur. All others were placed in the group of other infections. The files of 35 deaths were studied. It was discovered that 20 of these actually revealed rheumatic history and 15



TABLE IX

Apex murmur, systolic, constant, transmitted to the left, and/or mitral regurgitation, without known hypertrophy. Upper group with a history of rheumatic fever or chorea, lower group with a history of some other streptococcic infection, but without rheumatic fever or chorea.

ENTRANTS	EQ	MET	NYL	PRUD
M	501	372	63	36
F	121	124	26	5
	28	22	4	2
M	336	847	921	385
F	73	307	299	129
	22	47	56	15

some other infection although the original cards had given a percentage more nearly approaching that in this table. Thus probably more than half of the entrants in our material were actually associated with a history of rheumatic infection rather than as indicated.

DR. KIRKLAND — I am told by the Prudential actuaries that the method of separating these two categories was laid down by rule in the impairment study.

Dr. Ungerleider, you are on the other side of the fence, in spite of this. Can you add anything?

DR. UNGERLEIDER — This, I believe, is due to interpretation of the infectious process. You will note in the table with rheumatism or chorea we contributed 28 of the entire 56 deaths, or 50 per cent of all deaths for the four companies reporting, while in the last category only 22 out of 140, or roughly 15 per cent. If our people felt the infection was playing an important role in the disease process, it was placed in the first category, and if a lesser role, in the second category.

DR. KIRKLAND — Dr. Thomson, we've seen that the material is too small to work with in these two classifications broken down as to history.

Table X shows the four-company results with each subdivision. The combination of the rheumatic fever and other infection groups yields a ratio of 275, a figure not shown here. Will you comment on this, especially as to whether we might be justified in combining all transmitted murmurs in our underwriting approach.

TABLE X

Mortality experience ratios all ages and policy years separately by participating company and combined, all apical systolic murmurs, without known hypertrophy.

1. Localized, constant, non-organic
2. Transmitted, organic, no history
- 3 RF Ditto, rheumatic fever history
- 3 OTHER Ditto, other etiological factor
4. Localized, inconstant, non-organic

RATIOS ALL AGES AND POLICY YEARS (Deaths  
Subscribed)

MURMUR	EQ	MET	NYL	PRUD	4 CO'S
1	123	172	100	153	137
	43	56	27	36	162
2	217	265	167	218	224
	83	236	90	126	535
3 RF	245	336	370	175	277
	28	22	4	2	56
3 OTHER	319	290	267	213	274
	22	47	56	15	140
4	142	125	101	85	113
	28	37	10	25	100

DR. THOMSON — As can be seen in this table, the overall experience with the group with an organic apical systolic murmur and a history of rheumatic fever was almost identical with that in which the murmur was similar but there was a history of antecedent streptococcal infection. The overall mortality ratio for the four

companies is 277 in the former, 274 in the latter. This experience is in conformity with the present concept of rheumatic fever and its relationship to streptococcal infection. Furthermore, the preceding table clearly showed the great divergence in the coding practices of the four companies in handling these murmurs. In view of these facts the combination of these two groups appears reasonable and desirable. It is not quite as clear whether the cases with organic apical systolic murmurs and *negative history* should be grouped with those in which a *positive history* was obtained. Obviously, in many instances the diligence of the examiner in checking a history or the memory of the applicant determines in which category the case will be classified. Neither seems a sound basis for differentiation. Furthermore, the mortality experience of the group with organic apical systolic murmurs below age 50 without history is quite similar to the experience in the groups where a positive history is obtained. Taking all this into consideration, would it not be wise to combine all three categories of organic, apical systolic murmurs under age 50 in one group? It is a question that deserves serious consideration.

In passing, it is of interest to note that since 1952 cases with an organic apical systolic murmur and a history of rheumatism or rheumatic fever are coded separately whereas those with a history of streptococcal infection are grouped with those having no history of rheumatic fever or streptococcal infection. In light of the data presented here today, it would appear more realistic to combine all apical organic systolic murmurs together, irrespective of antecedent history.

DR. KIRKLAND — Dr. Getman, in the beginning I touched on three variants — the report, the underwriting, and the coding. The New York Life and the Prudential ask the examiner his own diagnosis. The other two companies do not. Have you any remarks?

DR. GETMAN — The diagnosis on the heart chart is sometimes helpful in cases where the description alone might lead the underwriter to classify the murmur as non-organic when the examiner really believes the murmur is organic. We have seen several such cases.

This whole problem of medical selection is composed of so many

variants and intangibles that to put one's finger on any particular factor as being of prime importance is impossible. It seems to me that discriminating medical selection by medical personnel properly weighing all these intangibles is the main factor leading to good or bad experience.

DR. KIRKLAND — Dr. Ungerleider, do you care to add anything?

DR. UNGERLEIDER — I notice a de-emphasis on what I consider one of the most important parts of selection — namely, the examination (source material). To dismiss this blithely is a serious error. We should emphasize and re-emphasize the seriousness of a life insurance examination to our medical examiners — that meticulous attention should be paid to the physical examination and especially to the heart diseases, which contribute so much to our mortality. Toward that end, I suggest that the American Heart Association booklet on examination of the heart, or some similar treatise, should be our textbook or bible and should be in the hands of our examiners. They should be encouraged to read it and follow it. Too often, as we well know, the examination is performed in a cursory manner, in an unsatisfactory place, or by examiners whose background may leave something to be desired. Our statistical studies are never any better than our source material.

DR. KIRKLAND — Thus, Table X summarizes the four-company experience at all ages and policy years. It requires no further comment other than to note again the over-all favorable mortality in the supposed non-organic groups, and the unfavorable trend in the apparently organic groups.

It is to be borne in mind that these studies have yielded results which are of limited value in their application to selection, and that, at best, certain trends have been indicated. We wish to stress also that we cannot hope to apply these figures literally to our underwriting approach, in view of the variations in company practices. We feel that our brief discussion may indicate the vital necessity of discrimination in the classification, underwriting, and coding of systolic murmurs.

DR. KIRKLAND — Now, we would like some questions from the floor. I find that the time allotted to our panel is rapidly be-

coming exhausted and we have many very interesting papers to follow. So, I will ask you to make your questions as brief as possible.

DR. JOHN E. BOLAND — Is transmission of a murmur of so much importance in determining whether or not it is organic or inorganic?

DR. KIRKLAND — Dr. Getman, will you reply to Dr. Boland's question?

DR. GETMAN — We rather feel that it is not as important as we have been led to believe in the past, but it is still carried on in our new code. We like to believe that a proper grading of the intensity of the murmur is the more important factor in judgment.

DR. KIRKLAND — I think in this connection that the use of the word "transmission" has been very badly overdone. It has found its way into common practice, both in our insurance work and in clinical medicine, but actually, I think it is reasonable to say that the element of transmission is really a reflection of the loudness of the murmur and the area over which it is heard.

DR. WILLIAM F. H. O'NEILL — I would like to have some of your panel talk to us a little about murmurs—if the examiner considers it to be functional and there is in the background a history of rheumatic fever or some streptococcal infection.

DR. KIRKLAND — That is one for Dr. Ungerleider.

DR. UNGERLEIDER — I was hoping you would give that to Dr. Thomson. If elements of life insurance selection are involved and you have a definite history to lead you to believe that this particular murmur has an antecedent infectious background, I think it cannot be ignored. You do not disregard the combination. I have been impressed by the number of doctors who ignore the importance of things that I learn in life insurance medicine to be significant as to increased mortality.

It seems to me that in such a case you simply have to take the bull by the horns and say, "Yes, I agree with you. I think it is functional, but our information is such that I have to take

another view." I would like to hear what Dr. Thomson has to say about it.

DR. THOMSON — In general, I would agree with Dr. Ungerleider in what he said.

The problem always comes up as to whether these so-called functional murmurs with an antecedent history of rheumatic disease represent no disease, or whether they represent mild valvulitis, for instance. And I think it seems pretty clear that even though it may be the latter, and there is no great threat to the individual's future from a serious cardiac impairment in terms of myocardial failure, at least for many years, one does have to remember always that a valve damaged with rheumatic disease, however slight, is a fertile field for bacterial infection. This is true also in a valve that is severely damaged with frank stenotic changes, for instance.

DR. KIRKLAND — I think it is pertinent to add, if I may, that this is the type of situation in which, certainly, there should be thorough investigation, if the amount of the proposed risk is sufficient to justify the additional expense involved. I think on larger policies and policies which, for one reason or another are particularly important, that we should make every effort to run these problems down to the entire limit of our diagnostic facilities.

DR. J. KEITH GORDON — Does anyone on the panel care to express an opinion as to how we might deal with an apical systolic bruit which had previously been a presystolic bruit, and the applicant had had a commisurotomy?

DR. UNGERLEIDER — If he has had a commisurotomy, I do not think any of us has had the experience on which to judge applicants of this type. Commisurotomy, as a procedure, is about eight years of age, or thereabouts. I think in Philadelphia they have done more of them than anywhere else and I doubt that they have done a thousand. I doubt whether 2,500 have been done in the whole world. So, for the time being, I think it best to delay consideration of these.

DR. WILLIAM B. THORNTON — I would like to ask how much

of a factor the inadequate examination of female applicants is in producing the high mortality ratios.

DR. THOMSON — We wondered if that might not be important, and I am trying to point out in the first category of murmurs, namely, the constant, apical systolic murmur, without hypertrophy, that one of the things that was apparent in the data was the difference in the number of males and females included in the study.

We had, I think, the worst experience, and we had the most females. The New York Life, who had the best experience, had the least number of females. But in trying to track them down, we were not able to make much out of it. We discussed it several times and wondered whether there was any point in mentioning the problem of inadequate exposure during examination, and whether that might be a factor. I do not know what the answer is, but nothing that we were able to find, in looking over our deaths, suggested that that was true.

We wondered if perhaps the hazards of pregnancy in these people, particularly if they had unrecognized heart disease, might have been a factor. And strangely enough, the deaths in the group that I spoke of, namely, those having the constant, apical, organic murmurs, were apparently not related to prior situations.

DR. WILLIAM M. GENTNER — Well, as underwriters, we go on day after day putting debits on the so-called mitral regurgitation, and apparently we are not getting hurt too badly. On the other hand, many of your best clinicians will say that pure mitral regurgitation is a very unusual condition, rarely existing without mitral stenosis. From an underwriter's standpoint, and from a life insurance point of view, would anybody on the panel like to comment on that problem?

DR. KIRKLAND — I don't think anyone would like to but nevertheless I am going to ask Dr. Getman to do it.

DR. GETMAN — I have no doubt that many of these cases that are described to us as pure mitral regurgitation have a pretty good factor of stenosis in them. Why we all get as good a mortality experience in that group I don't know.

A small percentage of pure presystolic murmurs are reported each year and I think we would all agree that in this group we do get an extremely high mortality. And, even though some additional elements may be present, and we have taken some undoubtedly in this group, we must accept the facts as they are and be guided by our figures.

DR. KIRKLAND — Gentlemen, I regret that we must terminate our discussion now. I thank you for your attention, and I thank the members of the panel for all the work they did on this presentation.

PRESIDENT BONNETT — I want personally to thank Dr. Kirkland, Dr. Getman, Dr. Thomson, and Dr. Ungerleider. It was very interesting to me, at least, to hear this panel discussion.

We are honored to have with us this morning Dr. J. Scott Butterworth, who will give the next paper and demonstration. Dr. Butterworth has developed a method for the accurate recording of heart murmurs on a tape which can be played back again and again, and preserved for comparison in the future with similar recordings on the same individual. While Dr. Butterworth's interests are in teaching more accurate diagnosis by means of these tape recordings, the potentialities of the methods he has developed are almost without limit in the field of life insurance.

Dr. Butterworth is Associate Professor of Medicine at New York University Post-Graduate Medical School; Visiting Physician, Fourth Medical Division, Bellevue Hospital; and also Chairman of the Professional Education Committee of the Scientific Council of the American Heart Association. It is a pleasure to present Dr. Butterworth.



## ACCURATE RECORDING OF HEART MURMURS

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I have enjoyed listening to the preceding discussion of apical systolic murmurs because it points up so many of the problems that are common not only in life insurance examinations but to anyone who practices or teaches cardiology. One of the situations that stimulated our present undertaking was the fact that none of our group could agree as to whether or not a murmur was organic or non-organic. Whether we are accomplishing much, it is too early to say but we now have a method whereby we can store murmurs on magnetic tapes so they may be reviewed at any time. The method will be described later in this paper.

What are the reasons for misinterpretation of the sounds of the heart? Among the problems in teaching we find that one of the most common difficulties concerns individual differences in hearing.

Figure 1 is a composite that has been made up from a number of sources. The heavy line in the graph is the threshold of audibility of a large number of people. The horizontal lines indicate intensity of sound, and the vertical lines represent cycle frequencies per second, or the pitch of sound. Note that the area of cardiac vibrations is a large one. It covers the field from almost zero cycles up to about a thousand cycles per second. We should refer to this as the vibratory spectrum of the heart because many of these vibrations cannot be appreciated as sound by the human hearing mechanism. It starts at the low end with the ballistocardiogram and we feel that the elements of the ballistocardiogram are simply part of the vibrational spectrum of the heart. As the cycle frequency increases we reach the lower range of hearing.

There may even be vibrations above this range which can be

heard only with very special types of equipment and the significance of which we do not appreciate at the present time, just as we do not appreciate the significance of the low-frequency vibrations below the auditory level.

Figure 1 indicates that the heart sounds come above the threshold of audibility, only between about 50 and 500 cycles per second, and even then they are only very slightly above that line.

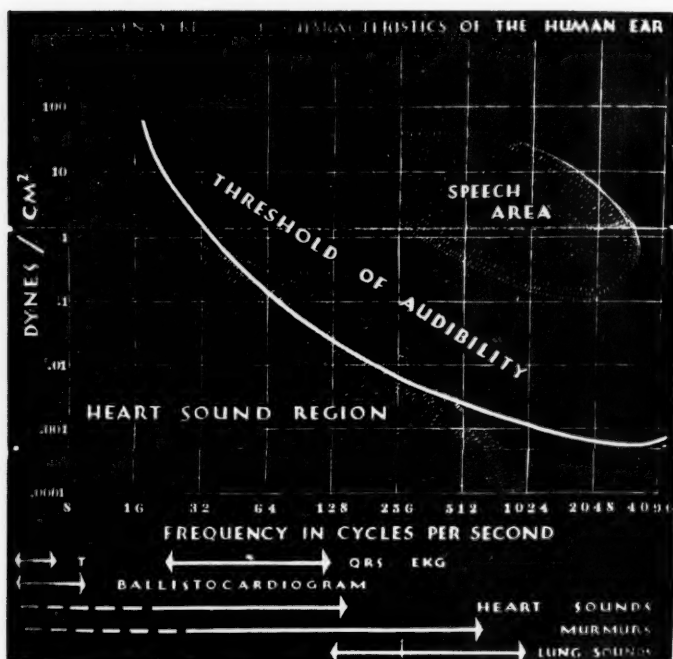


Fig. 1. The light line in the center is the average threshold of audibility. The speech area and the region of heart sounds are indicated. It will be seen that the heart sounds come above the threshold of audibility only between about 50 cycles per second and 500 cycles per second. Below the graph are indicated the approximate cycle frequencies of the electrocardiogram, the ballistocardiogram, heart sounds and murmurs and lung sounds. The dotted lines indicate regions where our knowledge is minimal.

In other words, the major energy of the vibrations produced by the heart are below the threshold level of the human hearing mechanism which is extremely inefficient for auscultation.

From this it is readily seen how minor changes in the threshold of audibility, as would occur from person to person, could easily result in the hearing or not hearing of a faint murmur. We are quite sure that many of the arguments that develop in clinical auscultation stem from the fact that not only are some of us not trained as well, but also there are certain individual variations in human hearing which enter into the picture.

We have found one gratifying thing, however, in making audiograms on groups of our students. Whereas a normal audiogram is very seldom performed at 64 or 32 cycles per second, we have been very happy to find that most physicians' low-frequency audiograms are fairly constant. Whereas a man 60 years of age may have marked deterioration in his high frequencies (speech range), his low-frequency response remains good and may be just as good, or better, than the response of some of the younger physicians.

This probably explains why some of the older clinicians, who are obviously hard of hearing as far as speech is concerned, can hear all kinds of diastolic murmurs which interns and residents ascribe to figments of their imagination.

The second factor which we feel leads to mistakes in diagnosis is the improper timing of murmurs. It is amazing how often this occurs. I have been guilty of it many times, and no matter how much one listens to hearts, or how much one thinks he or she knows about cardiology, failure to time sounds and murmurs is inexcusable.

Figure 2 is a stethogram to illustrate this point. This is a recording from a patient admitted to the medical ward with hypertension. The residents noted the presence of a loud apical systolic murmur. There is no question that this sounded like a systolic murmur. By inspection of the recording, or by careful timing of the murmur, however, it was found to occur during diastole and was due to aortic insufficiency probably resulting from a dilated aortic ring. The prognosis under these circumstances is vastly different from that of an apical systolic murmur.

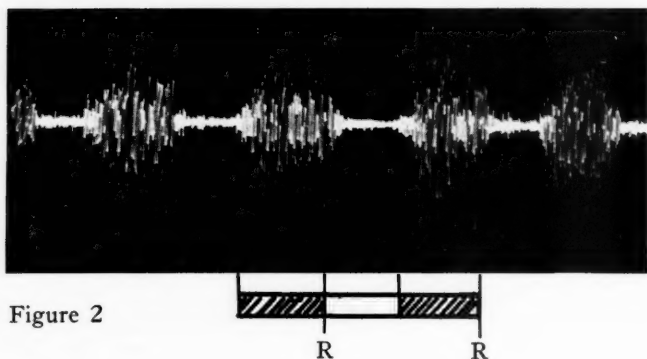


Figure 2

Fig. 2. This is a stethogram of a murmur which sounded like a typical blowing systolic murmur but was actually diastolic in time. R indicates a special sound triggered by the R wave of the electrocardiogram and indicates the approximate onset of systole. The clear box represents systole and the cross hatched boxes indicate diastole.

Fortunately, we do not have to deal with actuarial statistics, but if we did it would cause us constant anxiety, wondering how many murmurs were incorrectly timed. We see this so often that I cannot help emphasizing what a common error it is, even among physicians who are supposedly well-trained.

The third factor we have noticed leading to misinterpretation of murmurs is simply the lack of training, or more particularly, the lack of thinking about listening to the heart. It is amazing how much better a person can hear murmurs if he really concentrates on listening. I am afraid, particularly with some of the life insurance examinations, that auscultation of the heart is a cursory examination. If a lub-dub is present it is recorded as representing a normal heart, whereas by careful auscultation one very frequently hears an opening snap of the mitral valve, or an accentuated second pulmonic tone or some other abnormal finding which may on closer examination uncover some pathologic valvular change.

The human hearing mechanism is also peculiar in that it has "dead spots". If a heart sound is followed closely by a loud crescendo murmur, usually the ear cannot dissociate those two. It is similar to the eye: A brilliant flash of light will cause momentary blindness. The same phenomenon occurs with the ear.

If the process is reversed, however, and if the tone follows a decrescendo murmur, the ear hears it quite well and by playing some of our tapes backward it is easy to demonstrate this. (Fig. 3A and B)

We have been extremely interested in attempting to improve the teaching of auscultation and the equipment which we are using is the result of several years' work in that direction. To determine how much we accomplish, we have been using a tape recording containing ten unknown illustrations, all rather simple, such as mitral insufficiency, aortic stenosis, pericardial rubs, and others of this type. Because it is on tape, everyone hears exactly the same thing. Individuals are allowed to listen to each unknown for a minute and then have 30 seconds to write down the diagnosis. We have obtained some rather interesting results.

The first time we used this technique was an examination for the subspecialty board in cardiovascular disease, and of the 12 doctors examined, two had a perfect score. I am sorry to say that some of the figures ran quite far down the scale. Certain interesting things appeared. What we considered a classical presystolic murmur was called normal by more than one individual; a simple duplicated first heart sound was called mitral stenosis by several other individuals.

We quickly came to realize that many people have very faulty knowledge of auscultation and that they depend on other things, such as heart size, the electrocardiogram, and the history, to determine what they *should* hear rather than what they actually hear.

We have used this same "unknown" test on many groups. The majority of general practitioners will average from 40 to 45 per cent correct. After two or three days of special training in auscultation this can usually be improved to about 65 per cent. In other words, during that period of time we can increase their diagnostic acumen by about 20 per cent or more. We have no information at present regarding the effect of repeated episodes of training. Our most recent test was made on a group enrolled in one of the courses offered by the American College of Physicians. Whereas our average for general practitioners is 40 to 45 per cent, the average of this group was 69 per cent, which we consider to be a fairly good rating.

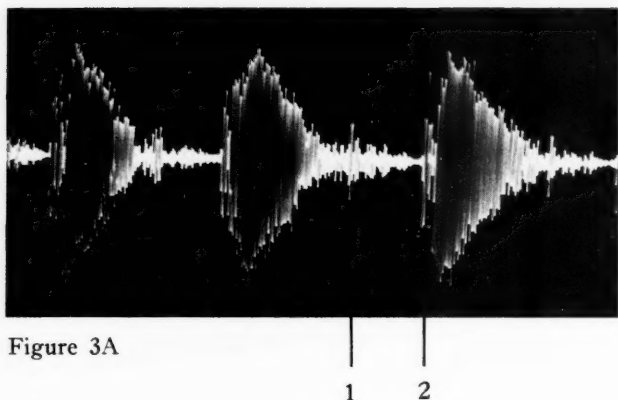


Fig. 3A shows a musical diastolic murmur which was the result of a ruptured cusp of the aortic valve. 1 and 2 indicate the 1st and 2nd heart sounds. The 2nd heart sound can be clearly seen preceding the murmur but could not be heard.

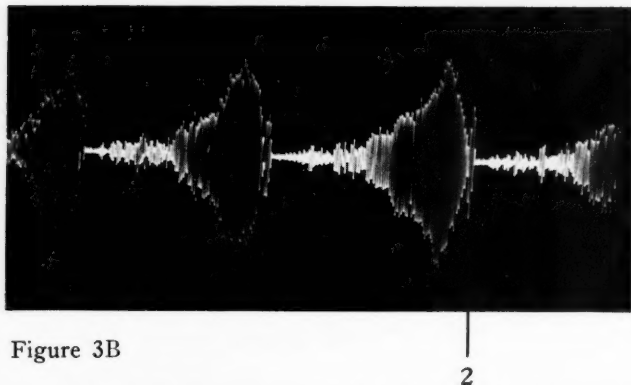


Fig. 3B is exactly the same murmur but the direction of the tape has been reversed so that the murmur is heard and pictured backwards. Under these circumstances the 2nd tone which now follows the decrescendo portion of the murmur and which in turn is followed by the silent portion of systole can be seen and also heard by the ear.

The apparatus we are using, and with which we have helped in the development, is illustrated in Figure 4\*. This consists of a large screen on which any type of electrical activity can be visualized such as the electrocardiogram, the vectrocardiogram, the balistocardiogram, or the stethogram. A special amplifier with suitable filters is used for reproducing accurately the heart sounds and any number of individuals can listen at the same time through electronic stethoscopes similar to the familiar acoustical stethoscope. Also contained in the instrument is a specially designed tape recorder which preserves the heart sounds for replaying at any future date.

We began our recordings a number of years ago by using disc recorders. These disc recorders are perfectly satisfactory. The great problem, however, is that the records wear too rapidly and surface noise becomes a problem. These records are technically much more difficult to make than the newer tape recordings. We have tried wire recording and other methods but the most practical type of recording at the present time is on magnetic tape which lends itself beautifully because it is easy to handle, splice and is readily made into loops.

We prefer to use electronic stethoscopes since we have found no other way to reproduce faithfully what physicians are accustomed to hearing with their own stethoscopes. We also feel very strongly that the combination of audio and visual methods is extremely important. The auditory sounds are helpful. The visual accompaniment which is actually a stethogram can be helpful used alone but the eye cannot discriminate well. We have all learned what breath sounds, hair under the stethoscope, or moving the stethoscope on the skin sounds like. The ear automatically discards these. The eye cannot do this and the most satisfactory effect is obtained by the simultaneous combination of listening and looking at the stethogram. It is amazing how much can be accomplished using this combination of simultaneous audio and visual methods.

In the remainder of my talk I shall attempt to point out how life insurance companies may benefit from these technical procedures. First of all, tape recordings give a permanent and ac-

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\*Educational Electron Cardioscope, Cambridge Instrument Co., Grand Central Terminal Building, New York City.

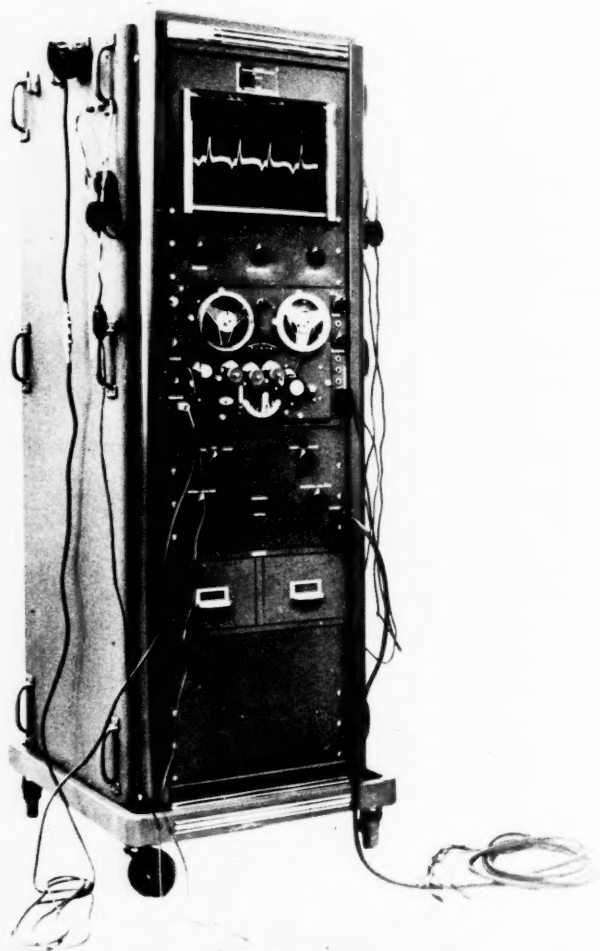


Fig. 4. Illustration of the Cambridge Educational Cardioscope. The screen at the top will portray the electrocardiogram, the stethogram, mixtures of the two, or any other phenomenon which can be translated into electrical potential. Below the screen is the sound amplifier and tape recorder for making permanent records of heart and lung sounds. The lowest panel is a double electrocardiograph amplifier for producing the electrocardiogram or the vectrocardiogram.



curate record of sound at the time the recording was made. It corresponds to the electrocardiogram which gives a record of the electrical activity of the heart at a specific time. This can be extremely helpful in cataloguing murmurs over a period of time without having to rely on descriptive terms to describe the character, intensity and other features of murmurs. I can easily foresee how it would be possible in all cases involving cardiac murmurs to have a tape recording forwarded to the Home Office where it could be accurately interpreted and kept on file. From time to time subsequent recordings could be made to see whether there had been any change in the murmur over a period of years.

The second way in which the life insurance companies could benefit would be in education of their examiners. Tape recordings are an effective method of education. One can easily see how it would be possible for the Home Office to distribute recordings them a post-graduate course of a type best suited to their needs. of typical murmurs and sounds to the field examiners and give If there were certain types of murmurs in which a particular company were interested it would be very easy to conduct a special educational program. Within a very short period of time I hope there will be tape libraries available for the interchange of all recorded heart sounds.

Then, of course, the third place where tape recording would be of extreme value is in research studies of the type which has just been reported. The statistics on apical systolic murmurs would mean a great deal more if your Medical Directors had been able to sit down and listen to each one of those murmurs and to analyze them individually to be sure of the timing, duration, intensity and character. If that had been possible, then I think these figures would have even greater value. Until the time when an accurate recording of cardiac sounds is generally available, I am rather doubtful if it is going to be possible to get accurate facts on which to base good actuarial statistics.

The solution of this problem lies in the collective hands of the life insurance companies. I have been interested mainly from the point of view of teaching, but the group that could benefit more than any other would seem to be the Medical Directors. You are in the position to determine whether or not this is to be developed.

You have the money and you have the means of deciding what type of equipment is essential. While we have our own ideas about what we think would be the most satisfactory, they might not necessarily agree with the life insurance point of view. For instance, the tape recorder should be a stable instrument; it should be light and portable. It should not be too hard to use, and should use a recording material that will be easy to store, easy to transport through the mails, and remain stable for many years.

The instrument that we are using is a fine piece of equipment but it might be too cumbersome for use in the field. It is perfectly possible to develop other types of equipment especially suited to your needs.

So, the decision rests primarily with you, the Medical Directors of the life insurance companies, as to whether or not this is to become a field that will yield fruitful results. If you do so decide, then you are the ones who should indicate your needs and propose the type of equipment you feel is necessary to carry out the program.

PRESIDENT BONNETT — Thank you, Dr. Butterworth. I think there can be no question in your mind of the interest aroused by your paper as well as the demonstration of the Cambridge Educational Cardioscope. We truly appreciate the great amount of effort that has gone into the demonstration.

Most of us will agree that much of the improvement in mortality of insured lives may reflect better living standards, but it is principally due to the advances which have taken place in the science of nutrition. This science is well exemplified in the Department of Nutrition at Harvard University's School of Public Health, and we are privileged, indeed, to have with us today Dr. Fredrick J. Stare, Professor of Nutrition and Chairman of the Department of Nutrition at Harvard University. He is also an Associate in Medicine at the Peter Bent Brigham Hospital, and Editor of *Nutrition Reviews*. The title which he has chosen for his paper is, "Changing Aspects in Nutrition", but I hope that he may be willing to tell us some of the interesting and varied activities in his laboratory.

## CHANGING ASPECTS OF NUTRITION

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Despite the considerable advances of the past 20 years in our understanding of the science of nutrition and its potentialities in both preventive and curative medicine, the vast majority of physicians, public health workers, and even the layman still think of nutrition in terms of clean, wholesome food and the classical deficiency diseases like scurvy and beriberi which have largely disappeared from this country.

Nutrition is concerned with food and the ingredients of food known as nutrients, what these nutrients do, and why we need them. It is important in public health practice to differentiate between nutrition and the usual concept of food in public health activities. At present the latter is largely confined to problems of sanitation such as food handling, refrigeration, contamination — in other words, making available clean, wholesome food. This is important, but it is not nutrition. Nutrition is the science of food and its relation to health, the effect of the ingredients of food (nutrients) — their absence or presence — on health.

Modern nutrition in modern clinical medicine has come to have several different connotations depending on whether one is thinking of diagnosis and specific treatment, or of patient management. The part played by nutrition in patient management often has been a neglected subject particularly since, in the past, nutritional status was difficult to appraise and also was thought to be less frequently the determining factor in the prognosis of the patient. Now that problems relating to infection are more readily controlled, the importance of supportive care is beginning to receive wide recognition; however, the principles of nutrition which should guide such treatment are still problems of current research. The interests

of nutrition in the patient extend beyond considerations of supportive care. In the field of preventive medicine, for example, research activities are constantly directed towards finding ways of preventing atherosclerosis, cancer, obesity, and a variety of metabolic disorders. In the field of diagnostic nutrition, a number of recently developed techniques involving the use of isotopes and other tracers are being successfully applied in the precise measurement of body constituents and hence determination of the nutritional status of patients.

In my discussion this afternoon I shall confine my remarks to a description of a few specific researches underway in our Department of Nutrition which illustrate the changing aspects of nutrition as they relate to problems of health and disease of contemporary importance to Americans.

First, I should like to comment on obesity. Because of the high incidence of obesity in this country, and because it favors the onset of many of the degenerative diseases, it is certainly an important problem in contemporary medicine and public health. While all observers agree that obesity is the result of an imbalance between energy intake and energy expenditure, the primary etiology of obesity has remained largely unknown. To explain obesity by overeating is not much more illuminating than to explain alcoholism by overdrinking. In the case of obesity, the problem appears to be: what is the factor—or what are the factors—which have disturbed the mechanism of regulation of food intake in such a way that the energy balance is tipped in favor of excessive food consumption? In broad terms I think one can say that obesity, like many other diseases, has multiple causes. There are physiologic and psychologic causes. Undoubtedly they are interrelated and contributions to either will help in a better understanding of the disease, and hence in prevention and treatment.

For the past ten years our department has been active in a variety of researches concerning obesity. These have involved both patients and animals and both physiologic and psychologic studies. A number of our staff and students have participated in them, particularly Dr. Jean Mayer and Dr. Martha Trulson.

The physiologic researches have been done principally by Dr. Mayer and his associates, and I shall briefly summarize some of their work.

First, what regulates one's appetite? It is obviously difficult to understand what may go wrong in a mechanism one does not understand. An early problem that had to be tackled was to try to get a clearer concept of the way appetite is regulated in normal animals and in man. I shall not take the time to tell you of previous work in this field dealing with gastric motility, bulk of the diet, and other factors that have been studied. Our researches dealt with rats, mice, dogs, and human subjects and from these studies we proposed a "glucostatic mechanism" for the regulation of food intake. The initial reasoning was as follows: The regulation of food intake proceeds by relatively frequent consumption of food. It appears improbable that hypothalamic centers are sensitive to decrease of the body content in fat or protein which during the interval between meals would represent an insignificant proportion of the total. On the other hand, the body stores of carbohydrate are limited. The glycogen content of the liver in man following a meal is of the order of 75 grams — only 300 calories' work. However, the sugar content of the blood throughout the day varies far more than that of the fat or protein content of the blood. Brain tissue prefers sugar as a food and indeed utilizes principally sugar. Thus it appears logical that the cells of that part of the brain which regulate appetite, which are in the hypothalamus, are sensitive to blood sugar — glucose — and we could refer to them as glucoreceptors.

A first test of this theory was obtained in normal animals. It was shown that increasing levels of blood sugar experimentally decreased food intake in rats: decreasing blood sugar within the normal fasting limits increased food intake.

The apparent paradox afforded by the good appetite of patients with diabetes in spite of blood glucose levels rising abnormally high, had to be resolved before it could be concluded that blood glucose levels regulate food intake. It appears that while absolute levels of blood glucose are increased in diabetes, utilization of sugar is decreased. For blood sugar levels to influence the cells of the hypothalamus that control appetite, the glucose has to cross the

membranes of these cells. This presumably implies phosphorylation through the hexokinase reaction. If phosphorylation is impaired as it is in diabetes, the high blood sugar will not be "efficiently effective" in these cells — in shutting off the appetite.

This concept of the importance throughout the day of blood sugar in regulating appetite has also been studied to some extent in man. With animals and with man we have been able to divide most obese subjects into what we refer to as "active" and "passive" states, the former being the period of active, and usually rapid development of obesity, the latter the period over which the obesity is maintained but not appreciably or rapidly increased.

We have found that patients in the active stage of obesity are apt to run lower blood sugars following a meal, and the blood sugar returns to pre-meal levels sooner. That, we assume, is why they become hungry and eat again. This process repeated many times a day, day after day, results in obesity.

Blood sugar levels are related to the character of the diet and the timing of food intake. Current studies attempting to apply this information may turn out to have a useful part in the prevention and treatment of some types of obesity.

Thus a changing aspect of nutrition, blood sugar levels throughout the day, may contribute to a better understanding of the cause, prevention, and treatment of obesity — surely an important factor in the "life span".

Briefly, I should like to tell you about another aspect of our obesity researches. These involve the hereditary — obesity — diabetes syndrome in the particular strain of fat mice we have obtained from the Bar Harbor Laboratories. Actually two types of genetic obesity have been discovered in mice. One, discovered many years ago, is called the yellow obesity gene, the obesity being associated with the color. The other was discovered only three years ago and as far as we know has only been extensively studied in our laboratories. These hereditarily obese mice are characterized by adult weight 2 to 5 times the normal (the excess weight being due almost 90 per cent to fat), and by elevated blood sugar, and sugar in the urine. Atrophic changes of the skin, loss of hair, and ulcerated skin surfaces are

generally observed. The obese animals show abnormal food choices, and, in spite of apparently normal gonads, do not mate. Physical activity is very low, a factor of considerable importance in the development of this form of obesity as the small increment in food intake shown by the obese animals does not suffice to explain the development of the obesity, unless the difference in energy output between the active non-obese animals and the lethargic obese mice is also taken into consideration. This we also feel is a very definite factor in much human obesity. (Obese animals fed the same amount as their thin siblings do not lose weight. They may even gain slowly.) Obese animals are sensitive to cold and show high blood cholesterols.

Obese animals are characterized by a block in the utilization of acetate, the near-end product in fatty acid oxidation. The excess of unoxidized acetate is converted for the main part back into fatty acids, a smaller part into cholesterol. This block thus appears to be basic to the etiology of this form of obesity.

Thus we have another example of changing aspects of nutrition — the elucidation of a specific biochemical abnormality in another type of obesity — an inability to metabolize effectively acetate, the acetate being converted back into fat, body fat and cholesterol.

*Practical Suggestions.* Because of our researches in obesity we are frequently asked for practical suggestions on its prevention and treatment. Our suggestions are the following:

1. Keep a written record of your weight — monthly or three or four times a year — and prevent obesity from sneaking up on you.
2. Exercise in moderation.
3. Eat less — as indicated by weekly weights.
4. Help in eating less may be accomplished by the following:
  - a. Eat a good breakfast with plenty of protein.
  - b. Eat slowly.
  - c. "Scientific nibbles", but these nibbles must be of food that would ordinarily be eaten at the following or previous meal.
5. Cocktails or dessert, not both.

6. Moderate servings — do not insist that your guests have seconds.

7. An extra cup of coffee or tea instead of dessert.

A second area of our current researches from which I should like to give one or two examples of where changing aspects of nutrition are of considerable importance concern the important disease atherosclerosis and some of its ramifications. Our approaches to this serious health problem are under the direction of my colleague, Dr. George V. Mann.

First, I should like to describe a study involving serum lipoproteins and cholesterol levels in man as they relate to caloric balance and weight reduction.

Determination of the role of weight reduction as a preventive and therapeutic measure in the control of atherosclerotic vascular disease is of considerable practical importance. Many physicians, health agencies and life insurance companies have sponsored programs designed to prevent and treat obesity. These programs advocate, in part, the achievement of desirable weight for the prevention of atherosclerosis. While various actuarial experiences indicate that obesity is associated with health impairments, this evidence has not adequately answered the question concerning the importance of weight reduction in the management of atherosclerosis. A recent study by Dublin and Marks of a large group of overweight people who reduced their weight seems to support the contention that such a procedure is beneficial.

Lipid metabolism has been implicated to some degree in the development of atherosclerosis in experimental animals and in man. There is widespread, although not unanimous opinion, that the serum levels of cholesterol and of certain lipoproteins are associated with, and perhaps even causally related to, the genesis of atherosclerosis. The measurement of these serum lipids as a diagnostic method is, however, the source of much confusion because of the uncertainty of the relationship of the lipids to atherosclerosis.

One approach to this problem is through study of the effect of treating obesity, or more generally, the influence of loss of weight upon the implicated serum lipid constituents. This question has been considered by several workers, but for the most part weight



reduction per se has not been the primary variable studied. The influence of low cholesterol and low fat diets upon the serum lipids has been repeatedly discussed but weight reduction has generally been an additional variable not well segregated and studied.

We have investigated the influence of weight loss upon the serum cholesterol and certain classes of lipoproteins in a group of thirty-nine human subjects.

The subjects were selected primarily according to their willingness to lose weight and return for repeated observations. Twenty-nine of these subjects had cardiovascular disease which served to motivate their cooperation. The remaining ten were well except for obesity.

Several of the subjects with cardiovascular disease reported some degree of cholesterol and fat restriction in their usual diets. In the beginning all subjects were asked to continue the diets to which they were accustomed while taking care to maintain their body weights. Control measurements of serum cholesterol and lipoproteins were made during this period.

After this initial period, caloric restriction was begun on a diet containing approximately 1,200 calories with 100 gm. of protein, 50 gm. of fat and 100 gm. of carbohydrate. The daily ingestion of two eggs was required to insure a minimum daily intake of 600 mg. of cholesterol. By this device a relatively constant cholesterol intake was achieved throughout. The aim was to have the subjects lose at least 2 pounds per week. The weight losing period was considered ended when a subject failed to lose more than  $\frac{1}{2}$  pound per week.

During the weight maintenance period the caloric intake was liberalized individually by additions to the carbohydrate and protein components of the diet. Fat and cholesterol intakes were continued unchanged. However, during this period seventeen subjects were instructed to cease the daily consumption of the two eggs and to avoid all other cholesterol-rich foods. This regimen was then continued for two months during which time serum lipids were measured in an effort to evaluate the contribution of the egg lipids.

It was not possible to induce each subject to reduce his weight to the desirable level. The group accomplished and maintained a weight loss varying from 7 to 40 pounds.

This average weight loss of 19 pounds in thirty-nine subjects led to a significant reduction of the serum lipoproteins and total cholesterol in the majority of instances.

The degree and permanency of this serum lipid reduction can be related to the initial level of  $S_f$  12-20. The influence of weight loss in reducing serum lipids is greater and more consistent in subjects with initial lipoprotein levels of 50 mg. per cent or more. In subjects with lower levels, no reduction, a reduction followed by a rebound, or even increases of serum lipids are observed with weight loss.

The degree of initial obesity is not a determining factor in the serum lipid changes and the rate of weight loss seems only slightly concerned.

Strong positive caloric balance in two subjects on a very low lipid intake was associated with significant increases of the serum cholesterol and lipoproteins. Thus caloric balance appears to play a major role in controlling these serum lipid levels.

On a low fat diet the cholesterol intake had no demonstrable influence upon the serum lipids.

We believe that *if* elevated serum lipid levels contribute to the causation of atherosclerosis, weight reduction is a proper treatment for this disease.

While we know of no direct evidence that elevated serum lipid levels contribute to the causation of atherosclerosis in man, there is considerable indirect evidence that such is the case.

Thus we have another example of modern nutrition — cholesterol and lipoproteins of the serum — contributing to further advances in our understanding of a disease, atherosclerosis, that affects the "life span" of man.

Another aspect of our atherosclerosis researches involves the experimental production of this disease in a species more closely related to man than the usual laboratory animals. We feel a major accomplishment during the past year has been the development of a technique for the production of atherosclerosis in the Cebus

monkey, and I might add it is preceded by an elevation of the serum lipids. This New World primate has been studied in our laboratory for the past five or six years. In the past couple of years we have found it possible to produce in a few months, by dietary means, a form of atherosclerosis which appears to be identical to that seen in humans. The atherosclerosis is produced in the short period of 18 to 20 weeks in adolescent monkeys on a diet low in the sulfur amino acids and with added cholesterol. Neither the lack of sulfur amino acids or the added cholesterol will by itself produce the disease in the length of time we have studied these monkeys, both conditions must be present.

The general belief that monkeys are resistant to experimental atherosclerosis is largely unfounded for few concerted efforts have been made to study or produce the disease in these animals.

Our study of atherosclerosis in these primates is the result of an observation three or four years ago when we started out to produce choline deficiency. For this study a diet low in available methionine was devised. In this diet the soy bean product known as alpha-protein, which has been shown to have a low level of available methionine, was used as the source of protein. It was observed that inclusion of cholesterol in such a diet led to hypercholesterolemia but only in the choline-fed control animals. Further investigation of this finding has led to a procedure for the production of hypercholesterolemia and atherosclerosis in monkeys.

The role of dietary methionine in the experimentally induced hypercholesterolemia was illustrated in observations on four monkeys that were fed a 15 per cent fat, high cholesterol diet made with 10 per cent alpha-protein. Two of the monkeys received a daily supplement of 1 gm. of crystalline dl-methionine. The other two monkeys received the same diet, but no methionine supplement. The latter two animals became hypercholesterolemic in two to three weeks. The serum cholesterol remained elevated until the eighteenth week when the animals were autopsied. The two animals whose diets were supplemented with methionine showed no such changes in serum cholesterol.

The curative effect of a diet higher in protein, and of better quality protein, was illustrated in the study of an animal that was

fed a diet containing 20 per cent of the methionine-deficient alpha-protein with no cholesterol for a period of fourteen weeks. During this time there was a loss of body weight but no hypercholesterolemia. At the end of this period the diet was altered to contain only 10 per cent of the methionine-deficient protein, 15 per cent of fat, and 5 per cent of cholesterol. Body weight continued to decrease but a very marked hypercholesterolemia promptly developed. After a period of sixteen weeks the diet was changed to one containing 25 per cent casein and the high fat, and 5 per cent cholesterol of the preceding diet were also maintained. The serum cholesterol levels were promptly restored to near normal levels and remained there despite the increased appetite and food consumption associated with the more adequate casein containing diet.

It was of great interest to determine whether the increased and sustained blood cholesterol produced would eventually lead to atherosclerosis. It has been reported that in dogs and rats persistent elevation of serum cholesterol levels have not led to atherosclerosis. The monkey described earlier and whose serum cholesterol had been elevated was sacrificed after a period of twenty-three weeks with serum cholesterol levels above 400 mg. per cent and with proportionate elevations of the serum lipoproteins. The autopsy of this animal revealed for the first time gross plaques of the proximal aorta and great vessels.

Autopsies were performed on 17 animals fed high cholesterol, and nine had maintained hypercholesterolemia for 18 or more weeks. Four of these animals showed aortic lesions which were marked, four showed minimal lesions, and one animal was negative both in the gross and microscopic examinations. Of the eight animals on this diet with hypercholesterolemia of less than 18 weeks, there was moderate aortic involvement in one, minimal in two, and five animals showed no vascular disease.

Thus we can say that 8 out of 9 monkeys in which a blood cholesterol level above 300 mg. per cent was maintained by this dietary regimen for 18 weeks or more developed atherosclerosis. Only 3 out of 8 monkeys developed atherosclerosis when the hypercholesterolemia was maintained for less than 18 weeks. None of the seven control animals showed demonstrable aortic changes.

Summarizing these studies we may say that atherosclerosis has been produced in Cebus monkeys by dietary means. This disease has been produced by feeding diets high in cholesterol and low in sulfur amino acids over periods of 18 to 30 weeks. Within 2 to 8 weeks this regimen caused the concentration of cholesterol in the serum to rise from 300 to 800 mg. per cent. The hypercholesterolemia could be largely prevented by feeding 1 gm. per day of dl-methionine or l-cystine as supplements to the diet. After the serum concentration had become elevated, it could be restored to normal by feeding dl-methionine but only partially restored by feeding l-cystine daily.

The vascular lesions were in the ascending aorta but extended from the valves of the left ventricle to the proximal portions of the carotid and femoral arteries. Minimal lesions have been observed in the coronary arteries. The lipids were in part cholesterol derivatives.

This study reaffirms the hypothesis that has guided much of our thinking in recent years; namely, that atherosclerosis is fundamentally a metabolic disease, subject to important dietary influences.

When one talks on this subject he is practically always queried on the application of the findings to man. In this regard one might say that dietary restriction of cholesterol and fats, both animal and vegetable, does not necessarily influence lipoprotein molecules or serum cholesterol unless the diet is almost completely devoid of these materials. Such restriction is impractical in treatment and makes it difficult to maintain good nutrition. Therefore, from a practical viewpoint, and on the basis of present knowledge, the best diet for the person with atherosclerosis is one which provides good nutrition, preferably one that is high in protein, and with calories to reach or maintain desirable weight.

As a last example of changing aspects of nutrition, I should like to tell you about an off-shoot of our fat emulsion researches. These have been in charge of my colleague, Dr. Robert Geyer. Some of you are probably aware of our researches involving emulsions of fat that can be given directly into the blood stream so as to supply adequate or abundant calories in a limited fluid volume to those patients who are rapidly losing weight and unable to con-

sume nourishment by mouth. We have used similar emulsions of fat as a carrier for fat soluble compounds we wished to introduce directly into the blood. One such compound has been the carcinogenic hydrocarbon 9, 10 — dimethyl — 1, 2 — benzanthrane. We have worked out a procedure whereby this substance along with some estradiol dissolved in fat, emulsified, and given to the female rat by vein results in the experimental production of cancer of the breast.

Cancer of the breast is still an important disease in this country. It certainly affects the life span. The unusually interesting part of our researches is that a technique has been devised that results in the production of this disease in 100 per cent of the animals and in the short time of sixteen weeks.

Tumor production by means of the method we devised offers the following advantages in the study of mammary cancer: (a) Rapid and reproducible tumor production, (b) tumor incidences of 100 per cent, (c) range in number of tumors per rat, (d) homogeneity of the type of tumors produced, and (e) a means for the simultaneous administration of other lipid-soluble materials. The latter has the advantage that each particle of such a fat emulsion is in itself a separate nonaqueous solution which carries with it some of each of the dissolved materials and thus, if absorbed by tissue cells, may furnish all the lipid-soluble components of the emulsion to the cell at a given instant. This circumvents the reliance on chance that is ordinarily involved when various lipid-soluble materials are given singly, or together, by other means, and fairly comparable rates of absorption are assumed for each. It should be pointed out, however, that, although the primary target in the present experiments proved to be the mammary gland, other tissues, especially the liver, initially take up large quantities of the emulsified lipids and may then act as sources of the carcinogen and hormone for later redistribution, provided that such tissues do not completely destroy these compounds. It is of interest that few tumors were found in tissues other than the mammary gland.

This application of using emulsions of fat that can be given intravenously as a vehicle or carrier for fat soluble compounds—in this case DMBA and estradiol—has considerable potentialities

in many fields of biologic research. It provides another illustration of modern nutrition applied to problems affecting the life span.

In conclusion I have attempted to illustrate by means of a number of specific examples how the changing aspects of modern nutrition are helping to make more comfortable and lengthen the life span of man—blood sugar and its relation to diet and appetite, the impairment of acetate metabolism in a type of obesity, the effect of caloric balance on serum cholesterol and lipoproteins, sulfur amino acid deficiency and cholesterol in producing atherosclerosis in a primate, and the experimental production of cancer of the breast in 100 per cent of animals in only sixteen weeks. You will pardon me if my examples have all been related from recent work in our laboratories but to do so involves less work on my part. Lastly, let me again emphasize that all of these studies have been done by a number of excellent, hard-working associates.

Those of you who are interested in reading about the examples of specific researches illustrating the changing aspects of nutrition will find our obesity studies summarized in a review in the current issue of *Physiological Reviews* (Vol. 33, p. 472, 1953); the weight reduction studies in man appear in the *American Journal of Medicine* (Vol. 14, p. 654, 1953); the experimental atherosclerosis is described in the *Journal of Experimental Medicine* (Vol. 98, p. 195, 1953); and the experimental cancer of the breast in *Cancer Research* (Vol. 13, p. 503, 1953).

PRESIDENT BONNETT — Thank you, Dr. Stare. Are there any questions? I know Dr. Stare will try to answer them.

DR. ROBERT A. GOODELL — I would like to ask Dr. Stare if any experimentation has been done to try to get the atherosclerotic lesions to regress after development?

DR. STARE — Well, we would certainly like to do that, but the point is, how are we going to do it? It would be nice if we could open up a monkey or so in which we think we have produced atherosclerosis by having it on this diet for 18 or 20 weeks, take out a portion of the aorta and put the monkey back together. We would like to be able to demonstrate these lesions, have the monkey

survive for two, three or four months, put him on a diet which we think would cause the lesions to regress, and then open him up again and find the lesions gone. Our success is problematical because the monkey must survive the operations and then we must cure the atherosclerosis. But, that is what we are going to try.

DR. RICHARD S. GUBNER — I would like to ask Dr. Stare if he has had any recent experience with the use of methionine in reducing hypercholesterolemia in man. My impression of the work that has been done thus far is that it, as well as lipoprotein agents, have not been effective.

DR. STARE — Your impression is perfectly correct. These agents are effective in removing fat from the liver. Whether they are effective in removing fat from the blood vessels, I do not know.

We have made one little study which has not been published, but is in press in the *New England Journal of Medicine*, of blood from supposedly normal adults who have no evidences of coronary artery disease. These blood samples were from 25 to 28 individuals mostly in their early 40's—who had high levels of cholesterol and lipoproteins. This is the type of individual that we would suspect is developing or has developed atherosclerosis. We put these individuals on six grams of methionine a day which we thought was a tremendous dose. We measured the lipid levels before, in the middle, and afterwards, and on that basis—six grams for a period of six weeks—we did not find any effect on the lipid level.

Now, maybe it was not long enough or perhaps the dosage was not high enough. I do not know, but so far, we do not have any evidence, or know of anybody who has any evidence, that lipid levels can be reduced by this therapy.

DR. GUBNER — Did you find a parallelism between cholesterol and lipoproteins?

DR. STARE — Sometimes yes, sometimes no. We really are only beginning to study our data and at this time do not have enough information to speak with any assurance on this point.

DR. OTTO GOLDKAMP — Can the actual increase of coronary artery disease, particularly in the younger age groups, be related



in any way to a change in our national diet over the last ten or fifteen years?

DR. STARE — This is possible but whether or not there is a relationship, I do not know.

DR. PAUL H. LANGNER, JR. — Dr. Stare, do you think that the low blood sugar in obese people in the active stage may be a primary metabolic defect, or is it due to the fact that they have excessive carbohydrate intake all along?

DR. STARE — Probably both are involved.

PRESIDENT BONNETT — Again, thank you very much, Dr. Stare. We enjoyed that tremendously.

For many years tuberculosis has presented a serious problem in classification of risks. It was not solved until we began securing x-rays on individual applicants and data from tuberculosis hospitals which helped to classify cases according to the standards laid down by the American Tuberculosis Association. Since then, our insurance mortality has been quite satisfactory, and deaths from tuberculosis have decreased year after year. This has led many of us to believe that tuberculosis might disappear entirely as a health problem, not only for insurance classification but for the public as well.

I have known Dr. Edgar M. Medlar for a long time, both as Pathologist at the Hegeman Memorial Laboratory at the Metropolitan Life Insurance Company's Sanatorium at Mount McGregor, and subsequently during his investigations in New York City, in the Veterans Administration. (Dr. Medlar is now Pathologist at the Herman M. Biggs Memorial Hospital, Ithaca, New York.) I have always been impressed by his clear evaluation of the problem of tuberculosis, and it is a great pleasure indeed to have him with us today to discuss, "Unfinished Business in Tuberculosis."

## UNFINISHED BUSINESS IN TUBERCULOSIS

E. M. MEDLAR, M. D.

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In 1941 the Commonwealth Fund sponsored the publication of a book entitled "Plague on Us" by Geddes Smith. In the prologue to this book the following statement is recorded: "We have not rid the world entirely of any single infection known to man and some we have not yet begun to fight. As for the premises for action, we do not yet know why one man sickens and the next goes free, why one pest seeks out the lung and another the liver, how drugs cure the ills they seem to cure, how disease begins and how it ends. — It is early to boast." In this book a chapter is devoted to "Unfinished Business" and it is the contents of this chapter which suggested the title for my remarks today.

Probably no single infectious disease has ever been as vigorously assailed with publicity as has tuberculosis. Elaborate programs and "crusades" have been carried out to educate the public. Clever slogans have been devised to sustain the public interest once they have been educated. Isolation of tuberculous patients under expert medical supervision and the reporting of all tuberculous cases have become an accepted procedure. Special emphasis has been given to the discovery of "early curable" cases. The results of meticulous analyses of mortality statistics have been widely publicized to show that deaths from tuberculosis are steadily declining. In spite of all of these efforts an annual crop of new tuberculous cases continues to be gathered in and the size of this crop has not declined at a pace which corresponds to the decline in mortality. Between 1930 and 1950 the mortality rate in tuberculosis declined 70 per cent in the United States and during the same period the case or morbidity rate receded only about 20 per cent. Before a critical look is taken at the results of some of the programs which have been used and an attempt is made to indicate the nature of the unfinished business in tuberculosis, it would seem appropriate to discuss briefly some fundamental facts about the disease which seldom have been given serious consideration.

We can all agree that the major problem in tuberculosis concerns the infection of the lung and that this infection is air-borne. The disease begins as a microscopic focus of lobular pneumonia which is too small to be detected in roentgenograms of the chest. Experimentally, it has been shown that air-borne particles which contain tubercle bacilli must be less than one two-thousandths of an inch in diameter, if they are to reach and be retained within the pulmonary tissue. Animals which inhale larger particles do not become infected. Careful study of lungs from persons who have died from causes other than tuberculosis indicates that usually the disease begins as a single focus and that unless this focus happens, by chance, to be in a vulnerable area of lung tissue progressive disease does not develop. In human adults the vulnerable areas are in the superior and posterior portions of pulmonary lobes.

The minute remnants of a healed tuberculous infection are found much more often in the lower portions of pulmonary lobes than progressive disease is found in the vulnerable upper portions. It would seem that the large majority of adults who inhale tubercle bacilli fail to develop progressive disease for the simple reason that, by chance, the bacilli have not lodged in a vulnerable spot. This is, of course, a most fortunate circumstance. Otherwise, this disease would assume epidemic proportions.

One of the chief features of pulmonary tuberculosis is that areas of lobular pneumonia often undergo necrosis. This pertains to the initial lesion in particular and the behavior of this minute necrotic lesion determines the future course of the disease. Commonly, these lesions are not over 2 mm. in diameter. If this lesion does not liquefy, it eventually heals completely, either as a fibrocalcific or a fibrotic nodule. On the other hand, if the lesion liquefies, early or later, the endobronchial sloughing of the necrotic contents frequently is accompanied by new areas of lobular pneumonia. It is this process which leads to involvement of a sufficient volume of lung tissue to make possible a detection of the diseased area in a chest x-ray and it is a repetition of this process in larger and larger areas of the lung which leads eventually to death.

Two features of the process of necrosis, liquefaction and sloughing are not sufficiently appreciated. First, early detectable progressive disease cannot occur without a previous liquefaction and

sloughing of a minute necrotic lesion. Secondly, the relapses which occur after a tuberculous patient has regained clinical health are caused by the liquefaction and sloughing of necrotic foci which have persisted. These are the features which separate tuberculosis from most other bacterial pulmonary infection.

An air-borne particle which is less than 15 microns in diameter can contain no more than a few bacilli. It is impossible to have a massive infection result directly and in short order from exposure to air contaminated with tubercle bacilli. On the other hand, necrotic lesions frequently contain large numbers of bacilli and massive infection is possible if the liquefied necrotic debris is spread within the bronchial tree. In other words, a progressive pulmonary tuberculosis is dependent not only upon the amount of sloughing, but also upon the extent to which tubercle bacilli have multiplied in the necrotic lesion prior to liquefaction and sloughing.

A person may develop progressive disease and die from the first microscopic pneumonic lesion. This occurs more often in young infants but it also occurs too often in adults in the second and third decades of life. In other adults a first infection may completely heal, mainly because the infected particles failed to lodge in a vulnerable spot, only to develop progressive disease later in life because a new contaminated air-borne particle had lodged in a vulnerable area. This situation occurs most often in the latter half of life and in the United States it is more prevalent in white males than in other segments of the population. It is evident that the tubercle bacillus is no respecter of age.

With these basic facts in mind, we can turn our attention to some of the publicity programs and try to find out what unfinished business may remain. In my opinion, the mortality rate in tuberculosis, tragic as it is and has been, has never represented the major problem. Persons dead from tuberculosis no longer contaminate the air with bacilli. The major problem revolves about those persons who live a long time with their tuberculous infection. To me as a pathologist this is clearly indicated by the failure of the annual crop of new cases to decline at least as rapidly as the death rate. For too long too great stress has been given to the mortality rate and too little attention has been given to the case or morbidity rate in tuberculosis.

The problem of determining the morbidity rate in tuberculosis has not been solved and certainly is one piece of unfinished business. For decades tuberculosis has been regarded as a family disease and great efforts have been made to examine all family "contacts" of new cases. The discovery of unsuspected cases through this program has been disappointingly small. This program did not consider the question which first should have been answered, i.e., "How did tuberculosis get into the family in the first place?" It is now well recognized that in the majority of instances the source from which the new case contracted the infection is not known.

My favorite illustration of the menace of an unknown dispenser of tubercle bacilli is drawn from the field of comparative pathology. The hobby of a wealthy business man was a farm with a pure-bred dairy herd. At the time of the big program to "eradicate" bovine tuberculosis it was found that over half of his animals reacted to tuberculin. At this time he engaged a veterinarian to obtain for him a tuberculosis-free herd. The program adopted was to dispose of all reactors to tuberculin, replace the losses with non-reactors, and to do tuberculin testing every six months until no more reactors were found. Over a period of five years new reactors were found at every period of tuberculin testing. One day the veterinarian was at the farm and, by chance, noted a pet goat go from one barn to another. On a hunch, and after considerable argument, the pet was sacrificed and was found to have extensive pulmonary tuberculosis. With the disposal of the goat the problem was solved. It is hardly possible to obtain a better example to show the menace of a single unknown spreader of tubercle bacilli in a group or community.

Recognition of the inadequacy of the program of examining home contacts to discover the unknown source of infection has led to a wide extension of x-ray surveys. Chest x-rays of whole groups within a community and community-wide surveys have been made and the latest program is endeavoring to get a chest x-ray of every adult on admission to general hospitals. All of these programs have revealed unknown cases; however, one of the flaws is that every adult is not examined. The effect of only partial coverage is well illustrated by a recent report from a large mid-

west university. In this institution every student was supposed to have a yearly chest x-ray; however, in a check-up to see how the program was functioning it was found that there was a small group of non-cooperators. Eventually every student in this small group was induced to have a chest x-ray with the result that, proportionally, ten times as many tuberculous cases were found among the non-cooperators than in the remainder of the student body.

Another error in mass x-ray surveys is that, although unknown tuberculous cases are brought to light, only those who are considered to have "clinically active" disease are "followed-up". Often it is not possible to determine the status of tuberculous disease from a single chest x-ray. This was well shown in a study of tuberculosis among patients in a large eastern mental institution. In a first x-ray survey those patients with "clinically active" disease were segregated and others with "healed" disease were not. World War II prevented any further study for a period of five years. A survey was then made to determine the status of the cases with "healed" pulmonary tuberculosis and it was found that fourteen per cent had died from tuberculosis and another fourteen per cent had "clinically active" disease.

One source of information which seldom is used to gain an insight into the problem of tuberculosis is the necropsy records of large general hospitals. A few facts obtained from a study of a large series of necropsy records in metropolitan New York with regard to open tuberculous cavities will be cited to indicate some of the problems which are inherent in the discovery of unknown spreaders of tubercle bacilli. At Bellevue Hospital, during the period of 1935 to 1945, one per cent of all necropsies showed open tuberculous cavities in patients who died from causes other than tuberculosis and who had never had a clinical diagnosis of tuberculosis. Although the records at Bellevue Hospital contained a larger number of such cases, cases of a similar nature were found in the necropsy files of three large private hospitals.

The author had the opportunity during the years of 1944 to 1947 to search for evidence of tuberculosis in the tissues from 1,332 necropsies performed by the Medical Examiners of the Borough of Manhattan. These were all cases of sudden and unexpected death and necropsies were performed to determine the

cause of death. About five per cent of these cases showed open tuberculous cavities and hence were a potent source for the dissemination of tubercle bacilli. In only thirteen of the sixty-one cases did the necropsy files show tuberculosis listed as the cause of death. Three-fourths of these cases were white males over 40 years of age. It was most unusual to find that a clinical diagnosis of tuberculosis had ever been made.

To indicate the widespread distribution of the unknown dispensers of tubercle bacilli in the population of a large urban center, a few cases from necropsy files will be cited. A truck driver had returned from a trip to Miami, Florida, and was found dead in the cab of his trailer-truck. Cause of death: carbon monoxide poisoning. A physician died ten days after surgical removal of a carcinoma of the bowel. Cause of death: acute peritonitis. A merchant dropped dead at his place of business. Cause of death: Coronary thrombosis. An elevator operator was found dead at the bottom of an elevator shaft. Cause of death: Traumatic injuries. A saleslady was found dead in a pool of blood in her apartment. Cause of death: Hemorrhage from a tuberculous cavity. This lady had been treated by a private physician for asthma. A waiter was found dead in the men's washroom in a popular dining establishment. Cause of death: Coronary atherosclerosis with cardiac infarction. A dentist had been treated for several years for a heart condition from which he died. No clinical diagnosis of tuberculosis had ever been made. Each of these cases had clinically unrecognized open tuberculous cavities in the lungs.

From these brief citations from necropsy data it would seem that there remains a great deal of unfinished business in the detection of unrecognized spreaders of tubercle bacilli. It is a problem which will not be solved quickly or easily.

We are now in an era of great confusion in the treatment of tuberculous cases. The "miracle" drug has captured our fancy and it can be stated, without reservation, that, as of today, no physician is sure as to how an individual tuberculous case should be treated. This undoubtedly is a most healthy situation, for the lethargic "wait and see" philosophy of the past has been rudely shaken. Remarkable clinical results and failure to pay heed to

some of the fundamental pathologic facts presented above have led many clinicians and "news dispensers" to present optimistic statements which, in all probability, will not be fulfilled with the passage of time. One thing is certain. There are many tuberculous patients alive today because of the beneficial effect of chemotherapy. On the other side of the ledger it can be recorded that there is no proof that a single tuberculous case has been completely cured of his disease by the use of chemotherapy.

I have had the opportunity to study several hundred portions of lungs which have been removed surgically from tuberculous patients after they had arrived at a state of good clinical health through the aid of chemotherapeutic agents. In the past these patients would have been discharged without surgery as excellent "cures." The disturbing feature of this study is that necrotic foci of tuberculous pneumonia persist even after long periods—a year or more—of intensive chemotherapy and that in a majority of instances tubercle bacilli can be easily found within the necrotic tissue. This situation pertains to the "early" as well as to the advanced case. It is my belief that a complete cure of tuberculosis cannot be obtained until the problem of the necrotic lesion, which is the chief harbinger of bacilli, is solved.

During the past twenty-five years my time has been spent in a study of the reaction of the host to the tubercle bacillus and of the reaction of the tubercle bacillus to its unwilling and unwitting host. My understanding of the various observations I have made is far from complete. However, it appears evident that there is no bacterial infection of the human race which presents a more difficult problem to solve than does tuberculosis. Considerable success has been gained in the prevention of death from this infection. This phenomenon should not be used to proclaim that this pest will shortly be conquered. On the contrary a smouldering infection continues to exist in the large majority of the tuberculous patients who have regained a state of clinical health. Under favorable circumstances these tuberculous persons may survive many years and die from other disease processes and during this interval an unknown number may act as propagators for a new crop of tuberculous cases. It is the living tuberculous



case which even today frequently is unknown that makes an eradication of the disease a stupendous problem.

Perhaps by now you have started to wonder why you have been subjected to this rambling dissertation on the problem of tuberculosis. Death claims from tuberculosis have been of considerable concern to you in the past, they are of less concern at present and, if the present trend continues, they will be of little concern to you in the future. If your interest in this plague ends there, then both your time and mine might better have been spent on other matters. However, I believe, and I trust that you will agree, that your stake in the problem of tuberculosis extends far beyond death claims.

You most certainly will run headon into the problem of tuberculosis in the field of health and accident insurance. Because of its inherent nature, tuberculosis always has and will continue to be a disease which has a tendency to relapse, unless a way is found to completely cure the disease. These relapses will bring loss of time from work if the disease is to be checked and a death claim is to be avoided. However, under wise medical management, exsanatoria patients can become an economic asset and these people should be employed. It is greatly to be hoped that, with a properly integrated employment-plus-insurance plan, the inability to work during periods of relapse will not deprive the tuberculous persons of health and accident insurance. Certainly, no family needs such protection more than the one in which the breadwinner has become an unwilling host to the tubercle bacillus.

I am informed that the three fundamentals for the success of free enterprise are courage, initiative and the taking of a calculated risk. Is it not possible to apply these fundamentals in the issuance of health and accident insurance to the tuberculous?

You who are engaged in the business of life insurance are vitally interested in the health of those you insure — from the profit motive, if for no other reason. I am of the belief that your concern extends far beyond the profit motive and that you have a bigger stake in the solving of many problems in disease than has any other business group. I know that you are supporting generously investigations into the diseases which contribute

most heavily to death claims. I hope that you have not yet written off your stake in the problem of tuberculosis.

I would like, in closing, to present to you an idea to which I trust you may give serious thought. Tuberculosis will never be eradicated until the problem of the necrotic pneumonic lesion with its bacillary content is solved. This means that a program of fundamental rather than developmental research should be launched to attack this problem. Such a program would require continued financial support in order that a sustained progressive investigation can be undertaken. A program of this nature should be set up within a tuberculosis hospital which is either in close association or is integrated with a university medical center. This, I believe, can best be sponsored by privately controlled funds, for it has been my sad experience that the dispensers of public funds have an almost irremovable blind spot with regard to the need for fundamental research in tuberculosis. It is a sad commentary that, as of the moment, no program such as I have suggested is in force in our United States.

PRESIDENT BONNETT — Thank you, Dr. Medlar. Are there any questions?

DR. M. HENRY CLIFFORD — Is there any evidence accumulated of the indiscreet use of ACTH and Cortisone increasing the unfinished business that you just spoke about?

DR. MEDLAR — Well, there has been an occasional case where ACTH has been used and following that they have had a marked flare-up of generalized miliary tuberculosis, and the individual has died. Just how much of that effect can be attributed to ACTH and how much to happenstance, I do not know, but I am not too familiar with the use of ACTH in tuberculosis.

PRESIDENT BONNETT — One problem which we recognize and about which we can do something is the heavy toll taken in young lives by accidents. In the past few years, this has been brought increasingly to the attention of the medical profession, and most surgeons and physicians have with vigor and enthusiasm co-operated in an extensive campaign to prevent these accidents.

Much remains to be done, however, and we are fortunate in having Dr. George M. Wheatley, Third Vice-President of the

Metropolitan Life Insurance Company, who has been in the center of this campaign. Dr. Wheatley is also chairman of the Committee on Accident Prevention of the American Academy of Pediatrics, and Chairman of the Home Safety Conference of the National Safety Council. He will now bring us his views on the relationship of the physician to accident prevention.

## THE PHYSICIAN AND ACCIDENT PREVENTION

GEORGE M. WHEATLEY, M. D., M.P.H.

*Third Vice-President*

*Metropolitan Life Insurance Company*

*New York, New York*

and

*Chairman of Committee on Accident Prevention,*

*American Academy of Pediatrics*

Risk selection is the art and science of underwriting. Risk mitigation is the art and science of preventive medicine, including accident prevention, applied to the insurance business. Both of these functions are the major concern of physicians in the field of life insurance. With these thoughts as a premise, I would like to tell you about some recent developments which reveal a growing participation of public health officials, medical investigators and practicing physicians in the safety movement. This may in the future have a real influence on both risk selection and risk mitigation.

### *Importance of Accidents*

In 1952 about 96,000 Americans lost their lives by accidents.<sup>1</sup> Only cardiovascular disease and cancer deaths now exceed those due to unexpected injury. Accidents are the leading cause of death from ages 1 to 34; are third to heart disease and cancer in the broad age group 35 to 54; and are fourth among persons 55 and over.<sup>2</sup> In contrast to cancer or circulatory disease, accidents all too frequently take the lives of those in childhood or in their prime. Or to express it in another way, fatal accidents cut off more years from the working life of the American people today than any other single cause of death.<sup>3</sup>

Mortality statistics, like the visible portion of a towering iceberg, although they command attention, show but a small part of the total social and economic loss. For example, the value of property destroyed and damaged by traffic accidents last year is estimated at \$1,500,000,000. All motor vehicle accidents costs

including medical expenses were \$3,750,000,000.<sup>4</sup> For every fatal accident, it is estimated that there are at least 100 serious enough to cause disability for a day or more. If we consider all battle casualties in World War II, the number of those killed and wounded combined was about one-tenth of the accidental injuries last year in the United States.<sup>5</sup>

What does this mean to our business? The implications of these vital statistics are obvious, but let me express it in more concrete terms. Last year payments of life insurance companies on account of deaths from accidents amounted to about \$125,000,000.<sup>6</sup> This sum is exceeded only by payments for cardiovascular and cancer deaths. Insurance companies have an increasing stake in the accident problem through the growth of accident and health insurance. In 1952 all companies in the United States selling personal accident and health insurance paid out in claims on account of accidents approximately \$215,000,000.<sup>7</sup>

It may seem paradoxical that we speak of the increasing importance of accidents as a cause of death and disability and at the same time can say that mortality from all accidents has decreased about one-fifth in the past three decades. The reason for this seeming contradiction is a reflection of the vast improvement which has taken place in the last thirty years in the death rate from the infectious diseases. Thirty years ago pneumonia and tuberculosis ranked with the cardiovascular diseases, cancer, and accidents as the major causes of death. Fifty years ago, tuberculosis was at the top of the list. Today it has dropped near the bottom of the first ten causes of death. In this period of time the major infectious diseases have dropped sharply, while the rate for accidents has shown only moderate improvement. The major gain in accident prevention has been in industry where control measures could be more readily applied. Much room for improvement remains, especially in traffic and home accident prevention.

#### *Medical Interest in Accident Prevention*

One of the most significant developments in the past several years has been the growing interest of physicians in the prevention of accidents. A number of medical societies have given the

subject an important place on their programs. Accident prevention committees have been created by national, state, and local medical societies. Many practicing physicians believe enough in prevention to undertake speaking engagements before lay groups and to help develop and serve on the boards of community safety organizations. Medical journals, including the *Journal of the American Medical Association*, are giving more space to the subject of accident prevention. Medical investigators are finding the subject not only fruitful, but virtually a virgin field for study. All of these activities are noteworthy. The medical profession, by and large, in the past has not been distinguished by its enthusiastic practice of preventive medicine. Furthermore, until a few years ago physicians would not have considered safety and the prevention of accidental trauma their responsibility. While this movement in relation to other medical problems and interests on the horizon can be likened to a cloud no larger than a man's hand, nevertheless, to those who are observing it closely, it appears to portend a new and better day for the entire safety movement; indeed perhaps for preventive medicine generally.

It is not accidental that this effort is spearheaded by physicians who are concerned with the care of children. This segment of the medical profession has already successfully applied preventive medicine to private practice.

One pediatrician cogently explained this new preventive effort and at the same time revealed unconsciously, I expect, what makes a good pediatrician when he wrote: "With a third of all children who die, dying of accidents, I have come to the conclusion that as long as I work only on the prevention of disease, I am only partly serving my patient's interest."<sup>8</sup>

The leadership of the American Academy of Pediatrics in this movement stems from the recommendations of its nationwide Study of Child Health Care in 1946-47 which were reported and interpreted to the profession and the public in 1949.<sup>9</sup> In 1950 the Academy created the Committee on Accident Prevention. That same year it established liaison with the National Safety Council when a member of the Academy was invited to serve on the Council's Board of Directors.

Before discussing the accident prevention program of the Academy, let me briefly describe other major agencies concerned with the prophylaxis of accidental trauma in order to show that here too the medical profession has begun or is beginning to play a more conspicuous role of leadership.

#### *National Safety Council*

One of the chief divisions of the National Safety Council is the Home Safety Conference, which has a section on Medicine and Public Health. Both of these important units are headed by physicians. Through this organization the Council cooperates with the American Medical Association, the American Public Health Association, the American Academy of Pediatrics, and many other medical and public health groups. Examples of co-operation are the joint meetings between the National Safety Council and the American Academy of Pediatrics in 1950 and 1952, when outstanding programs on accident prevention in children were presented in the Grand Ballroom of the Palmer House to an audience of pediatricians and safety workers attending the annual conventions of the two organizations. The National Safety Council works through community chapters. Many of these have physicians on their boards and committees.

#### *American Public Health Association*

Public health officers are giving attention to the growing importance of accidents in the health picture. The U. S. Public Health Service has established a home accident prevention unit. Several years ago, under the leadership of Dr. Donald B. Armstrong, the American Public Health Association created a Committee on Home Accident Prevention. This committee has been active in stimulating studies by local health departments, especially to secure more accurate data on the cause of home accidents. Safety programs in health departments have received the greatest impetus from the Kellogg Foundation. The Foundation has committed about a quarter million dollars to current projects in California, Massachusetts, Ohio and Michigan.

#### *American Medical Association*

The American Medical Association, through studies by its

Councils and Committees and through its publications, has for some years been concerned with accidental trauma. Not long ago an editorial in the *Journal*<sup>10</sup> discussed home accidents and urged physicians to give active support to educational efforts to reduce them. The Board of Trustees of the American Medical Association at the Clinical Session in Los Angeles in December 1951 put the Association on record to investigate the serious problem of childhood poisoning and to conduct a campaign of prevention. The Association's Committee on Pesticides of the Council on Pharmacy and Chemistry has been actively studying this phase of the accident problem as a part of its program of investigating the hazard to health of pesticides.

#### *A Medical Society Program*

What can individual physicians do about the prevention of accidental trauma? Some might say that practically there is little the physician can do to protect his patients from accidents. Many think otherwise. Perhaps a good way to indicate the possibilities is to describe the *child* accident prevention movement launched in 1950 under the leadership of the American Academy of Pediatrics.

#### *Education*

In that year, as mentioned earlier, the Academy established a national Committee on Accident Prevention. By means of personal correspondence, circular letters, round table discussions, papers at regional and state medical meetings, exhibits at the American Medical Association, Academy of General Practice, and state meetings, and through medical journal articles, the Committee is informing physicians about the child accident problem and suggesting methods of local solution.

In at least thirty-five states, pediatricians have been successful in enlisting the cooperation of state medical societies, public health agencies and other organizations to give special attention to the child accident problem. Last year in twenty-nine of these states, medical societies distributed, with a covering letter to general practitioners and pediatricians, nearly 50,000 copies of a brochure, "Are You Using the New Safety Vaccine?", prepared for the Academy by the Metropolitan Life Insurance Company. The brochure described accident prevention as a new kind of immuniza-



tion to be included in the physician's health supervision program, but given mainly to the parents to help them anticipate common risks and to take reasonable precautions at certain stages of child development. This new approach applies knowledge of child behavior and growth and is the Committee's unique contribution to child accident prevention.

This activity on the part of state medical and public health groups led to requests from practicing physicians for a similar publication addressed to parents. To meet this need, the Metropolitan produced last year "A Formula for Child Safety." It contains the illustrations and text of the brochure sent to physicians. Over 483,000 copies of this publication have been distributed in eight months. A large proportion has gone to physicians for use in their offices. This year, at the suggestion of a practicing physician, the Company has published a child safety check list entitled, "A Letter to Parents." This is designed for use by physicians in practice. When this check list was offered a few months ago to the 3,000 members of the American Academy of Pediatrics in private practice, it resulted in requests for over 187,000 copies.

There are many other recent and useful publications on child safety. The Children's Hospital of Boston has published an effective booklet on the prevention and first aid handling of pediatric emergencies. Since the Readers Digest called attention to it, many tens of thousands of copies have been sold. The Cincinnati Children's Hospital also published recently an excellent pamphlet on this subject.

For the past two years, the Prudential Life Insurance Company's Western Home Office has done an intensive job of child safety education in the seven western states in cooperation with public health and safety officials and pediatricians. An attractive booklet, "Your Child's Heritage", and other literature has been made available to many individuals and community agencies on the Pacific Coast.

We have no accurate information on the number of physicians who give child safety instruction to their patients, but from their interest in using the publications mentioned, and the requests we receive from physicians for slides and other assistance in giving

talks on the subject to both professional and lay audiences, we believe it is increasing. Eighty-five per cent of the membership of the Academy reported to our Committee that they now give such guidance as a part of health supervision. We find that some physicians have printed their own child safety literature; some use an office bulletin board to post news clippings of accidents and safety suggestions.

This educational effort of physicians with child patients shows what can be done through leadership and by physicians who practice preventive medicine. Applying this concept to prevent industrial, traffic, and home accidents to adult patients is another problem. As an example of the need and the opportunity, a recent editorial in the *Journal*<sup>11</sup> of the American Medical Association urged, as one important approach to the control of traffic accidents, the careful examination of patients known to drive cars. The editorial concluded by saying: "If the patient's life or the lives of others can be saved by a warning from his physician of the hazards of driving because of certain physical or mental findings, he will be experiencing an extension of medical care that is in keeping with the demands of modern life."

It is shocking to discover how little evidence we have on the relationship of physical or emotional impairments to traffic accidents. At a recent medical meeting one physician emphasized the importance of this by stating he had three epileptics who were permitted to drive and all three had been involved in accidents. He believed that legislation was needed to keep these individuals off the road. But we lack well-documented studies of handicapped individuals and car operation.

The reduction of occupational hazards, though a prime aim of industrial medicine, is largely the responsibility of industrial accident commissions and of safety engineers. But the physician should judge with great care the influence of physical or emotional disorders on the ability of the worker to perform his job safely. For that matter, there is great need for more research in the entire area of accidents by medical and public health trained investigators.

#### *Susceptibility to Accidents*

In adults, at least, there are no doubt many factors which account

for susceptibility to trauma: defective coordination; inherent clumsiness, temporary impairment of motor skills brought on by fatigue, illness, medication or drunkenness; chronic impairment of motor skills as a result of faulty vision, deafness or neural lesions. Psychologic factors may include tendency to absent-mindedness, emotional tension accompanied by neuro-muscular tension, and subconscious desire for involvement in accidents in order to express hostility or atone for guilt. While these seem obvious as contributing factors in accidents, there are few carefully controlled studies of the person in relation to accidents.

It is clear that the physician can make an important contribution to the prevention of accidents by recognizing these factors and doing everything possible to eliminate them or aid the individual to avoid injury-inviting situations.

Undoubtedly, physical and emotional factors are important in childhood injuries too but they may not have the same significance. Because of inexperience and immaturity, all children — especially those under 2 or 3 years of age — can be considered accident-susceptible. Much of a child's learning is through experience. He falls frequently before he learns to walk. He experiences minor cuts and burns before he understands the meaning of "sharp" and "hot." Very little study of the older child who has frequent accidents has been done. Recently Langford at the Presbyterian Medical Center reported observations on a small group of youngsters between 6 and 11 who had had a large number of accidents and another group with no accident history. Both groups came from the same neighborhood and attended the same schools. Income levels and other factors were also similar.

Each child was given a complete physical, neurological, and ophthalmological examination and a battery of psychological tests. Personal data were gathered for each child. Factors in the family, neighborhood, and school environment also were investigated. The groups are too small to furnish data of statistical significance and only the most tentative conclusions can be drawn from a preliminary analysis of the data obtained. However, Langford<sup>12</sup> reports that certain characteristics seem to stand out in the general behavior and reaction patterns of both groups. The accident-repeater child seems to be overactive, restless, and impulsive. He tends to

want to be older than his age and does not seem to get a feeling of security at home. He tends not to retreat from dangerous situations and becomes more impulsive under stress. Children in the non-accident group appear to be more timid and submissive and to come from more closely united family groups. This is merely an example of the contribution which a medically oriented investigation can make to accident prevention. The multi-disciplinary approach used in the Presbyterian Hospital study promises to give us significant new knowledge not only in the understanding of child accidents, but has already contributed new methods and techniques to the investigation of accidents at all ages. A clearer definition of the personalities and characteristics of those who have frequent accidents should have important implications for the underwriter in risk selection.

That insurance companies have a great stake in this problem has been appreciated, especially by the casualty companies who with a few of the larger life companies have been active in the safety movement for many years. Casualty companies have been strong supporters of the efforts of the National Safety Council and other organizations to control traffic and industrial accidents. The results would seem to have justified their expenditures on risk mitigation. Today, the worker is more likely to have an accident off the job than on. About a third of all accidental deaths occur in and around the home.

With the growth of accident and health insurance and the entry of more life companies into this field, it is timely and prudent for the entire industry to increase its efforts to reduce the risk of accidents to this growing number of policyholders. We need to do more in traffic and home accident prevention. The field which needs the most attention is home accident prevention. Homes are not easy to reach. It takes the combined efforts of many interested agencies. One business which reaches into many homes is life insurance.

The life insurance industry has played a major role in the battle which man has been waging with his environment in the past fifty years. This struggle resulting in a remarkable degree of control has been directed against the communicable diseases. The means of control have been sanitation, immunization and the newer anti-

biotics. Today, machines and toxic chemicals — thanks to our technological progress — are greater threats to life than germs. The protection of the individual from these and other causes of injury is a challenge worthy of the skills of modern medicine and public health. Our industry can and should give greater support not only to the medical and public health groups active in the safety movement, but to the National Safety Council, which is the general headquarters for the entire safety operation in this country. Physicians in our business are strategically situated to help marshal appropriate assistance from their companies for the safety movement.

Accidental trauma, of all the leading causes of death, offers the most promise at the present time for further substantial improvement in life expectancy.

PRESIDENT BONNETT — Thank you very much, Dr. Wheatley. Are there any questions or discussion from the floor?

It would take a courageous and knowing scientist to tell us of the hazards of our entry into the atomic age. Some of us saw, at the last Annual Meeting of the Association, photographs of the atomic bombing of Hiroshima, so that we now have a very slight hint of what might happen if one of our cities was H-bombed. Many of us, however, are not aware of the day-to-day hazards of the use of radioactive substances in the laboratory, in the manufacturing plant, in transportation, or when leaks or accidents occur, such as at the Chalk River Plant in Canada. Our sole safeguard lies in the care with which our safety standards are established and maintained, and careless accidents are prevented.

We have with us today Dr. Reynold F. Brown, Chief Medical Examiner of the New York Life Insurance Company in San Francisco, who will outline "The Present Status of Radiation Safety."

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## THE PRESENT STATUS OF RADIATION SAFETY\*

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There has been so much written on the fearful aspects of atomic energy that we find it difficult to gather together a single concept that will express this release of energy in other than destructive force. Perhaps one of the most significant concepts that has been proposed is the one stating that for the first time in man's history he has become a geologic force. He holds the power to change the contour and division of the land and water on a scale heretofore only within the control of nature. We should remind ourselves that this power can be used for building up as well as tearing down. The point to remember here is that if disaster overtakes us, it will be a deliberate action requiring careful planning. There will be no accidental destruction.

Perhaps one of the most discussed aspects of atomic energy is the radiation associated with it. The problem resolves itself into determining whether we can use this radiation without biological damage to ourselves. Let us bring ourselves up to date then on what radiations we are concerned with and what we know to date of their biological effects.

We can define radiation as being energy propagated through space. This propagation can be achieved by particles such as electrons and neutrons or by electro-magnetic rays such as x-rays and gamma rays. This energy interacts with matter and produces biological change by means of ionization. The quantitative unit of x-ray or gamma ray producing a given quantity of ionization is

\*From the Medical Dept., New York Life Insurance Co. and the Radiation Safety Division, University of California.

the roentgen. The roentgen produces in a gram of air an absorption of 84 ergs of energy. Since the elements that make up tissues are not too different from air, one roentgen per gram of tissue produces roughly a similar amount of energy absorption. By correlating the number of ionizations and energy absorption, we can express nearly all types of ionizing radiation in terms of roentgens.

TABLE I

<u>SOURCE OF RADIATION</u>	<u>AMOUNT OF RADIATION</u>
FLUOROSCOPIC EXAMINATION	10 to 20 r a minute
ROUTINE CHEST X-RAY	0.5 to 5 r per exposure
PELVIMETRY	3 to 20 r per examination
LEUKEMIA	5 to 15 r per treatment
CANCER	3500 to 5000 r in one month
ESTIMATED LETHAL DOSE for	
50 to 90 per cent of those exposed	400 to 600 r
Radiation Exposures in Diagnostic and Treatment Procedures.	

Table I shows the number of roentgens delivered under circumstances with which we are familiar. The fluoroscope can be installed and satisfy safety recommendations and still deliver 20 roentgens per minute at the top of the table. In other words, during a gastrointestinal survey where the patient is standing against the table-top in the erect position, his skin can receive 20 roentgens per minute during the examination. In the course of the examination the patient may receive 100 or more roentgens delivered to his skin. This may not always be in the same area since the screen is moved about during the course of the examination but the patient does receive a considerable exposure. The average chest x-ray delivers approximately a tenth of a roentgen per exposure; in pelvimetry a patient may receive 3 to 20 roentgens per examination, but it is also noteworthy to observe that the fetus at this time receives about this amount as total body radiation. With 25 roentgens



being the approximate dosage at which observable biological changes in the blood count can be determined it is apparent that this top figure of radiation approaches an amount that may become really objectionable.

The above illustrate common exposures in diagnostic roentgenology. In therapeutic roentgenology a single treatment for leukemia may be from 5 to 15 roentgens of total body radiation and this may be repeated at intervals. In cancer we sometimes deliver to a small area of the body from 3,500 to 5,000 roentgens or more and this may be delivered within a month. A brief consideration of this slide shows us that we need a concept of area and time to understand the biological consequences of a given amount of radiation. A gastrointestinal survey with fluoroscopy delivering 100 roentgens to a patient and a single treatment of skin cancer delivering 600 roentgens to a patient will serve a useful function and in the case of the gastrointestinal series produce no biological change. However, 600 roentgens delivered to the total body would probably kill a human being and 100 roentgens delivered to his whole body would have a definite biological effect that could be observed by routine medical examination and blood count.

If then, radiation effect biologically is proportional to the volume irradiated, it is easy to arrive at the conclusion that our first problem is to keep down our total body exposure to ionizing radiation. In the course of living all of us receive biologically damaging radiation. Cosmic rays deliver at sea level an average of about one-tenth of a roentgen a year; in Denver, due to its altitude and atmospheric conditions this is raised to about five-tenths of a roentgen per year. This radiation is beyond our control and our population accepts one-tenth to five-tenths of a roentgen per year, and added to this is a further amount from the natural radioactive material in the earth and in our bodies. Since we receive this order of radiation without detectable injury, it can be assumed at this time that one-tenth to five-tenths of a roentgen per year or about one-thousandth of a roentgen per day is an unavoidable minimum exposure. The maximum safe exposure is not so easy to determine. In 1931 the Advisory Committee on X-ray and Radium Protection endorsed a tolerance dosage of two-tenths of a roentgen per day. In 1936 this Committee reduced this amount to one-tenth of a

roentgen per day. In 1942 the Metallurgical Project of the Atomic Energy Program adopted a tolerance level of a tenth of a roentgen per day. In 1950 the International Commission on Radiological Protection recommended five-hundredths of a roentgen per day or three-tenths of a roentgen per week. Note that over a twenty-year period the maximum permissible exposure recommended decreases. If we accept the one-thousandth of a roentgen per day as the unavoidable minimum, we will now accept 50 times this amount as safe but 20 years ago we would have accepted 200 times this amount. It is this type of observation that has prompted the recommendation that all radiation be kept at the lowest possible level consistent with accomplishing the task and considering economy of time, space and money. This guiding principle operates throughout the fields of endeavor using ionizing radiation. To insure the continued application of this rule varying degrees of direct supervision are employed. The important concept is that we receive radiation only with our knowledge and consent.

There is one further point to keep in mind regarding radiation exposure. Safety committees are actually keeping down the exposure for a year's work below that received by a patient in having a chest film made and this may seem unreasonable. The reason for this is the assumptions that are made:

1. The exposures to workers are assumed total body radiation.
2. It is assumed he will work all of his life in radiation work.
3. The exposure was received a little each day over the year.
4. It is reasonable to keep all exposures as low as possible especially when our geneticists tell us that radiation damage has no threshold and that some genetic effect may be conceivable at any level including that we receive from cosmic rays.

The first aspect of radiation safety is the absolute control of radiation. The principles of radiation safety can be enumerated in the following way:

1. Know the exposure before the work is done. This

principle has great application in the atomic energy plants where dry runs are performed and physicists precalculate each procedure before embarking upon it. One might use this principle to define irradiation accident by saying that whenever one receives radiation above the amount precalculated and preaccepted an accident has occurred. This does not mean any harm has occurred but it points up the fact that we want to control completely the radiation we are using.

2. Keep the exposure as low as possible within the range required by the work.

3. Keep all personnel exposure below accepted maximum permissible exposure in any procedure.

4. Set up a monitor system for continued observation to insure maintenance of the precalculated exposure rates. Use personnel monitoring devices for checking each individual.

5. Determine and record the health status of each employee and repeat this determination at intervals. Each person working with radiation or potentially exposed wears a film badge and the films are developed weekly. Upon employment each person is required to have a chest x-ray, a complete blood count, urinalysis and physical examination; a repeat blood count every six months and another complete work-up every eighteen months. Any blood count abnormalities are thoroughly investigated. All abnormalities of history or physical examination are followed up as indicated. All exposures over 50 milliroentgens per week are recorded in the patient's chart. Any violation of exposure limits is investigated and stopped. When employment or work with radiation ceases another complete work-up is done.

6. Preplan procedures for any eventuality in case of accident. These principles, then, define a Safety Division. Note that they do not enter into what work will be done or who will do it, but concern themselves with how it will be done. Whenever a procedure does not conform to these principles it is redesigned or workers are rotated

or some definite change effected to make it conform. Otherwise the work ceases. There are approximately 1,000 people in this program at the University of California — exclusive of those projects under contract with the Atomic Energy Commission — so it is evident that in the nation as a whole there is a sizable and growing number of people working with radiation. To date it has been confirmed that if work is done with control, the hazard of radiation is a potential one and it has remained under complete control.

Having then set forth the principles of radiation safety, what has it accomplished? In 1952 Hempelman published nine cases of accidents in the atomic energy plants. There have been published approximately 20 other cases, some of these taking place in laboratories outside of these plants. There are probably others unpublished, but when one considers the thousands of workers involved, the safety record has been outstanding and there is no indication at this time that a radiation worker has any increased mortality hazard or increased personal injury.

TABLE II

<u>SOURCE OF RADIATION</u>	<u>AMOUNT OF RADIATION</u>
COSMIC RAYS, average	0.1 r a year
COSMIC RAYS, Denver, Colorado	0.5 r a year
AEC PERMISSIBLE DOSE (for 20 years of exposure)	15 r a year at a rate of 0.3 r a week
AVERAGE 10 HIGHEST EXPOSURES OF OAK RIDGE WORKERS	4.2 r a year
AVERAGE ANNUAL EXPOSURE OF ALL HANFORD-OAK RIDGE WORKERS	0.2 r a year

The Exposure Record in Atomic Energy Plants.

Table II shows the exposure record in the atomic energy plants. It is interesting that in the average exposure in Hanford it is actually below the radiation received by the average citizen residing

in Denver, Colorado. Without going further into details, we can observe that the radiation exposure of persons associated with electro-magnetic energy is preplanned and controlled within limits so that, to our knowledge, it will not result in any injury now or in the future.

That leaves us with the big problem of what to do about accidents. To date, the general safety record of personal injury has been well above that of comparable chemical plants in general industry. Accidents which have damaged material, but in which the personnel involved sustained no injury, confirm the fact that the Radiation Safety Program is effective in preventing personal injury. Accidental damage to plant and equipment increases the cost of using radioactivity and delays the day of its industrial use, but that is not of vital concern to us. It should, however, keep us alert to the inherent danger so that we will not allow the excellent safety record of the past to be used as a reason for discontinuing the safety program in the future. If, however, time reveals that all the observations we have made today are true, then it is entirely possible that radioactivity will become a useful servant to us all. In a manner similar to the use of electricity, we will find it in safe amounts in every home doing useful work and, again, increasing the hours of leisure time.

When this paper was first discussed, some specific questions were given me. One of these is, "What hazards are involved in the production of fissionable material?" First, there are the hazards involved in any large industrial plant. We know from past experience that this type of installation can have serious accidents. Over and above this type of hazard there is that of possible radiation exposure to damaging amounts of radiation. Perhaps one way of understanding how this hazard has been minimized is to consider the capital investment of a plant producing fissionable material. Whereas a plant could be built for one million dollars to perform certain processes on non-radioactive material, the cost would go over twelve million dollars to deal with the same amount of material, which was identical in every respect except that it was radioactive. This is illustrated in Table III. For each million dollars for operational expenses in a non-radioactive plant, two million dollars will be spent in radioactive plants. Thus, for each two

million dollars spent on the processing of non-radioactive material there is an outlay of fourteen million dollars for radioactive material. This additional twelve million dollars is spent to provide safety to the work. This care in planning the production of fissionable material maintains the radiation at a minimum. The records of exposure bear this out to the fullest extent. The design of the piles makes a disaster virtually impossible. There are several quenching devices that can stop the chain reaction. These devices do not depend on human vigilance; any malfunction of material or equipment sets them in operation and shuts down the pile. For details of the entire program there is an excellent book available from the Superintendent of Documents, Washington 25, D. C., entitled, "The Control of Radiation Hazards in the Atomic Energy Program" which will satisfy the most skeptical as to the magnitude of radiation hazard to workers.

TABLE III

	<i>Case I</i>	<i>Case II</i>
Structure .....	\$1,383,000	\$ 27,000
Process equipment, including installation	4,332,000	103,000
Utilities (steam, water, electric, phone)	412,000	190,000
Ventilation .....	264,000	3,000
Process material storage .....	542,000	290,000
Waste disposal .....	745,000	46,000
Railroads, roads, safety and security fences, etc. ....	93,000	58,000
Site preparation .....	380,000	30,000
All other .....	4,019,000	253,000
Total capital investment .....	\$12,170,000	\$1,000,000

Table of Comparative Costs for Radioactive and Nonradioactive Processing Plants.

Another question was, "What hazards are involved in the transportation of radioactive material?" Regulations are quite strict in defining the amount of radioactive material that can be shipped at any one time and the kind of containers for transporting radio-

active material. There have been no accidents involving personal injury in the transporting of radioactive material to my knowledge. At the present time there is considerable thought being given to the problem of controlling the number of separate shipments that may finally arrive in one railroad car, even though they emanated from separate points. All this is designed to keep down the concentration of radioactive material at any one point at any given time.

Another question was, "Is there a possibility of leaks in production piles?" Yes, they can occur but, in general, the damage will be to plant and material, not personnel, and while this damage to plant and material may be of such serious nature as to require the shutting down of the plant, it is likely that most of the damage will be an economic one rather than a personal injury one. Likewise, as experience accumulates safety precautions improve so that what once was a possibility or even an occurrence is not likely to recur.

Another question was, "What hazards are involved in medical experiments?" The very nature of medical experimentation, or experimentation using radioactivity at any level, is that of the reaching out into new ground by many different workers. It is easily understandable that this type of work will have the least preplanning and perhaps involve the greatest hazard as experimental work has involved the greatest hazard in almost any field of endeavor. While it has never been the policy of any of the committees involved to attempt to restrict investigation, general rules and regulations have tried to confine the use of radioactivity to people with some experience in its use or to people who, before they use the material, will become qualified.

The next question was, "Of what value are periodic blood counts?" There is at the present time considerable discussion as to whether it is desirable to continue periodic blood counts on large groups of workers. Some observers believe that where work is supervised and film badges are worn, the periodic blood counts, being so variable, are of no value and constitute an unnecessary expense.

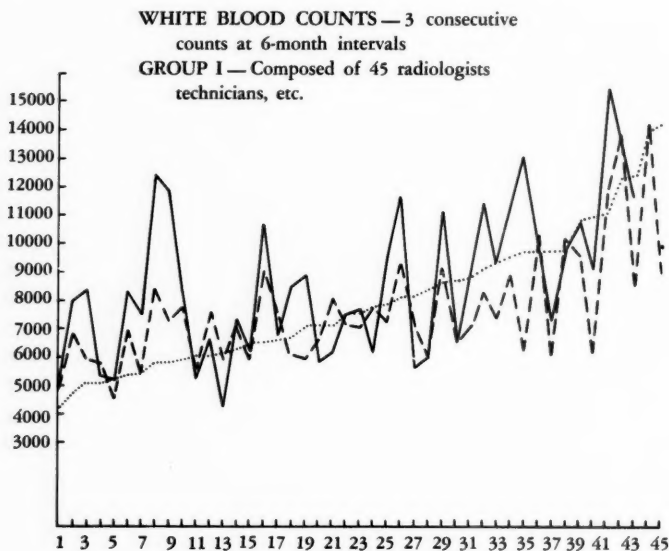


Fig. 1. Example of Experience With Approximately 50 Workers in "Group I."

Figure 1 is an example of our experience with approximately 50 workers in what we call Group I — namely, radiologists and technicians. The dotted line represents their first total white blood count. These have been arbitrarily arranged from the lowest to the highest count. The extreme range of values is noteworthy. The dash line is the second count recorded six months later. The solid line is the third count after another period of six months. It is interesting to note that at this interval the low counts are higher and the high counts are lower. The curve tends to flatten out, but there are still individual variations. It should be noted also, that we begin to get an idea of the normal total leukocyte count on any given individual. It helps then to do the following:

1. If an accident occurred, we could better assess the possible biological effect on those people where the radiation received was borderline.



2. It would also keep us better informed on those unquestionably affected, but whose individual variations might lead to misinterpretations. Inhibition of cell production might be diagnosed in an individual whose average count for years had been below 5,000.

Without going further it demonstrates that periodic blood counts serve a useful purpose in the evaluation of the health of an individual, and would have value in case of radiation exposure. They have little value as a monitoring measure in radiation safety and we do not consider them in this way.

Our present belief is that they should be continued, but that discretion should be used by the medical officer as indicated by the circumstances in any particular case. Thus, a research worker using only a few microcuries of p32 in a project might be excused from periodic blood counts. This is not advisable for those persons working in fluoroscopy and whose potential exposure remains high.

"What exposures are routinely given to military personnel or, what exposures would they be allowed to take?" In peacetime maneuvers the precalculated dosage to military personnel has always been within safe limits, to the best of my knowledge. In other words, there have been no violations of the previously accepted maximum permissible exposure except for a very short period and the amounts continue to be very small. In warfare, however, anything can happen, but remember that these exposures would be on a mission basis, they are not lifetime exposures. Remember also that when we consider the exposure of workers, we are assuming that they receive this exposure every day of their lives, whereas military personnel would be receiving their exposures for only a short period of time.

"What effect have the peacetime tests had upon civilians or civilian installations?" It is not conceivable at this time that there have been any effects upon civilians by any of these atomic tests to date. It is possible that the general background radioactivity of the atmosphere may be increased, but the amount will remain exceedingly small and, to the best of our knowledge, will not at any time, now or in the future, ever have any effect upon the civilian population.

We can summarize then by stating that all of us in our lifetimes are going to be subjected to increasing amounts of radiation, either in the form of diagnostic x-ray studies, therapeutic radiations of one type or another, occupational radiation, increased use of radioactivity in industry and the home, perhaps even increased radiation in the surrounding atmosphere, but we have every reason to believe that the use of radiation for peaceful purposes can become another great tool in the service of mankind.

PRESIDENT BONNETT — Thank you, Dr. Brown, for a very authoritative and reassuring paper.

Yesterday we reviewed what has taken place in the past and some of our future problems. One of these, I am sure you will agree, is intimately concerned with medical examiners, their training and their ability. You have probably read, or at least glanced through, the reprint of the comprehensive talk by Dr. George Packer Berry, Dean of the Harvard Medical School, which reviews in some detail the tremendous amount of thought which has been given to the problem of educating doctors for the future.

The central theme which seems to have emerged in the past few years is that doctors should be concerned about the whole man and, therefore, not only able to diagnose physical conditions, but to recognize and evaluate problems originating in the psyche or emotional life, either independently or as complicating factors of physical disease. One of the really significant experiments which Dr. Berry discusses is now entering its second year at Western Reserve University. It is under the immediate supervision of Dr. Thomas Hale Ham, our next speaker.

While Dr. Ham has the assistance of a staff in carrying on this experiment in medical education at Western Reserve, he is the spearhead and largely responsible for its success. I think I am safe in assuring him that we in life insurance medicine would be tremendously relieved if our examiners were all able to evaluate a "nervous" person or the whole man, as well as his organs, when making an insurance examination. Dr. Ham is Professor of Medicine, and Chairman of the Committee on Medical Education at Western Reserve University. It is a great pleasure, indeed, to introduce Dr. Ham.

AN EXPERIMENT IN MEDICAL EDUCATION AT  
WESTERN RESERVE UNIVERSITY.  
A SYMPOSIUM ON THE EVOLUTION  
OF THE PROGRAM

(Editor's Note: The following symposium replaces the talk given by Dr. Ham to the Association on the same subjects. It allows more completeness for the reader and makes the data available in the open literature. The material is obtained with minor modification through the courtesy of the American Medical Association<sup>1</sup> and the Alumni Bulletin, School of Medicine, Western Reserve University<sup>2</sup>.

*CONTRIBUTORS*

Joseph T. Wearn, M. D., Dean, Professor of Medicine and Director of the Department of Medicine.

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*SYMPOSIUM*

DR. WEARN — During the past six or seven years the Medical School at Western Reserve University has been in a rather unique position to attempt an educational experiment. That is due to the fact that in about seven years' time we have had to find new heads for eleven out of thirteen departments; and of some twenty-seven

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(1) Panel Discussion: The Evolution of an Experimental Program of Medical Education at Western Reserve University. Proceedings of the Annual Congress on Medical Education and Licensure, Chicago, February 8-10, 1953, reprint, p. 20.

(2) Orbison, J. L., The New Medical School Curriculum, IV, Phase 2A, Alumni Bulletin, School of Medicine, Western Reserve University, 17, 82, 1953.

professors, about two-thirds were appointed to this rank in the same period.

When these men were being selected it was of the greatest interest to me that, without exception, every one expressed the opinion that the time was ripe to approach the whole subject of medical education in a comprehensive way and to see what we could do if we had a clean slate in setting up a medical curriculum.

With the facts coming in so rapidly, it has become impossible for the students to memorize all the medical facts which are important. Dr. Vannevar Bush, with whom I had the privilege of working during the war, in his book, "Modern Arms and Free Men," stated that medical education is quite foolish not to profit by what the biochemists, chemists and engineers have done.

The chemist no longer attempts to memorize every single formula, but has a handbook in which he can find at a moment's notice the answer to his question, just as an engineer can find the size of a beam that is needed to support a given weight in a bridge. The medical curriculum has become so overburdened with facts that it was our feeling that the time had come to see if we can arm the students with basic principles that will enable them to tackle any problem that comes up, and not just memorize facts whose application they do not clearly understand.

All of the discussion of this kind welled up during the war, and immediately after the war action began in a great many medical schools. As you know, Colorado, Harvard and others have approached various parts of this program. The only difference is that we have tried to approach it from an over-all point of view.

This has not been a hurried program. Since 1945 we have been having many meetings of members of the faculty, these meetings growing in length and growing in interest and growing in intensity of debate. Finally, the faculty asked unanimously that we find some individual who could coordinate and lead this program.

When the time came to crystallize this, Dr. Lester Evans, an associate of many years in discussions on medical education, was approached. In 1950, the Commonwealth Fund made a very generous grant which enabled us to undertake this study.

I have never known any problem of research or clinical work or

any experiment that involved either the care of a patient, teaching or research, that has had the time and effort given to it that has been given to this program. The faculty has met. Individual committees have met. They have spent Saturday afternoons and Sundays and summer vacations, and in one instance last summer the faculty set aside a time and met in a country spot on an open lawn for three straight days, without interruption.

When one gets that type of debate, that type of interest in medical teaching, in my opinion something good is bound to come from it, because ideas are expressed frankly, no punches are pulled, and an advance is made not because of thought of one man or two men, but by the effort of the entire faculty — part time, full time, clinical and preclinical.

This is a fact the importance of which I cannot over-emphasize, because this absolutely free discussion by instructors from all departments and academic grades has greatly improved our understanding. It has brought the clinician to the biochemist, the microbiologist to the surgeon.

We found we were not talking the same language in the beginning, and some of us have found, without too much discouragement, that we still cannot understand some of the things the chemists are talking about. They do not understand all we say when we talk about certain clinical subjects. But getting all our people around the table arguing about medical education and working out methods of teaching, has been of great benefit to all of us and has made it possible to create the plan for this experiment. It is a group experiment, and, it is also one which will be modified by our experience.

#### *The Background of the Experiment*

DR. CAUGHEY — It is clear that any experiment in medical education has its roots in the accumulated experience, the academic tradition, to which both schools and individuals are heirs. The experiment at Western Reserve University is no isolated phenomenon. It cannot be separated from the developments which have been going on and are still going on in schools and hospitals all over the country, and it is of course clear to all of you that such experimentation in medical education has been greatly aided by

the Council on Medical Education and Hospitals of the American Medical Association and its sister organization, the Association of American Medical Colleges. At Western Reserve we have profited a great deal, not only from our study of published reports on educational experiments but also from personal visits to other schools and from conversations with those who have come to Cleveland.

Our faculty has been particularly interested in correlated teaching, such as has been carried out at Bowman Gray, the Graduate School of Medicine of the University of Pennsylvania; the University of Colorado; the University of California in Los Angeles; at Harvard; and in clinical programs at the University of Pennsylvania, Boston University, Cornell and the Medical College of Virginia<sup>3-5</sup>.

We have had many contributions from individuals who have stopped to talk over problems with us. Among these have been President Cole of Amherst College, Dean Carman of Columbia, and Professor Carmody of Haverford, to mention only a few. They have been of material assistance.

Unless attention is given to the history of medical education, it is easy to forget that the medical curriculum, although fairly well standardized in our schools today, cannot really be called a traditional curriculum because it began less than sixty years ago, and was not generally adopted until after the Flexner report in 1910, only forty-three years ago.

The present clear-cut separation of the preclinical from the clinical training of medical students, which is indicated in some schools by a geographical separation and in many others by an intellectual isolation between the two faculty groups, began in this country when the basic sciences were brought to medicine as a new phenomenon and added to a preceptor type of physician training which had had two centuries of tradition behind it.

Sixty years ago the clinical teachers had very little common ground with the scientists from biology, chemistry and physics

(3) Hubbard, J. P., Mitchell, J. McK., Poole, M. L., and Rogers, A. M., The Family in the Training of Medical Students. *Journ. Med. Ed.*, **27**, 10, 1952.

(4) Berry, G. P., Medical Education in Transition. *Journ. Med. Ed.*, **27**, 17, 1953.

(5) Faulkner, J. M., Extramural Facilities in Medical Education. *Journ. Med. Ed.*, **28**, 9, 1953.

who were being attracted to teaching positions in medical schools. The pattern for our curriculum today was cut then and this pattern has not been altered to fit the progressively closer relationships between them.

The strict departmentalization of medical schools and their teaching programs was an almost inevitable result of accepting the university as the agency best suited to elevate the standards of physician training. Because of their responsibility in widely separated areas of knowledge, universities especially in Germany, evolved a departmentalization which was convenient for specialized scholars interested in research, and for students seeking a great variety of educational objectives.

At the time that medicine adopted this pattern of the university, there was little question raised as to the appropriateness of university departmentalization in the education program of medical students, all of whom were seeking training in the same professional area, and most of whom would devote their lives to clinical rather than academic work.

We have become so accustomed to this type of university leadership that it is difficult for us now to imagine what pattern we might have in medical education in this country today if, in the 19th Century, the hospitals, the local medical societies or the state licensing boards had assumed preponderant roles in the direction of medical education.

In the United States, the medical colleges have been slow to develop a true status as graduate schools. At first in this country, physician training followed right after graduation from high school, and it has been only recently that we have reached the place where it is agreed to require three years of college training for all premedical students.

It has been easy to lose sight of the fact that today the great majority of students entering medical schools have bachelor degrees, and the selected group average more than twenty-two years of age. Our habit of speaking about "undergraduate" medical education contributes to our confusion.

Perhaps because of a lack of intellectual discipline among college students in general, or because of the tremendous pressure exerted

by the weight of information that medical teachers wish to transmit to their students, medical schools have tended to develop rigid programs. In most schools the student has little room for voluntary action. All students are expected to follow the same pattern, irrespective of variations in their interests and abilities.

The instructor is often a threatening figure who uses examinations to compel attendance and attention at his lectures, under threat of expulsion from school.

This is a far cry from the concept of a graduate school, where a mature student, with the friendly guidance of his instructor, begins a process of self-education which will lead him toward independent, scholarly achievement. In fact, the formal teaching activities of our medical schools are in some ways better described as high-class training rather than as educational programs.

In respect to the developments at Western Reserve University School of Medicine, it is not easy to give any specific date to mark the beginning of this study. Discussions have been going on, as Dr. Wearn mentioned, for several years, and have been based on ideas from many sources. There is no claim to originality. In fact, it is probably correct to say that the only unique thing about the Western Reserve situation is that the faculty has put a comprehensive new program in operation, and is not just talking about what might be done.

This ability to act arose from certain special circumstances in the school. Dr. Wearn became Dean in 1945 and, as he said, there has been a large addition to senior staff since that time. This influx of new people has made a great impact on the school, and has contributed to the ability of the school to move forward.

Shortly after Dr. Wearn became Dean, he proposed the organization of the General Faculty, which consists of all the members of the faculty above the rank of assistant clinical professor, plus one or two junior members from each of the 13 departments. The legal faculty delegated to this group full responsibility for student affairs, instruction and interdepartmental cooperation, and it has been the General Faculty which has been in charge of this program at Western Reserve.

In this General Faculty, the first educational issue was raised



early in 1946 on the subject of course grades. There was much dissatisfaction with the emphasis placed by the students on precise scores made in each examination, and their tendency to concentrate all their attention on material which they expected to encounter in the next test. A committee was appointed to study this matter, and it reported in November 1946 with recommendations, one of which was that the use of comprehensive examinations be carefully considered.

The committee appointed to study comprehensive examinations made a report early in 1947 in which it suggested that correlative examinations should be given at the end of the second and third years. It is of considerable interest that the General Faculty refused to accept this recommendation, on the basis that the students were already overloaded, and that if we added a general examination on to the things they already had to carry, it would be too much.

Furthermore, they thought this was a very indirect method of approaching the problem of correlation of instruction. At this meeting there was general agreement that further study should be done on the curriculum, and a committee was appointed to study correlation of instruction. If the committee decided that such correlation should be accomplished, it was expected to outline a method.

This Committee on Curriculum was the kind of committee that is familiar to all of you in medical schools, I am sure. It was made up of members all of whom were very busy already, and all of whom had primary and pressing obligations in other matters than the curriculum.

They met regularly about once a month and handled the general statements very nicely, but they did not get any detailed work done in the intervals between meetings. The committee contributed a good bit to the education of the members of the committee, but it was not long before they saw that the type of educational research which they felt would be desirable could not possibly be accomplished under such an organization.

On April 30, 1948, the committee reported to the General Faculty, pointing out some basic deficiencies in the educational

program, and recommending the creation of a faculty position for a person to devote a major portion of his time to the study of educational problems.

The General Faculty accepted the idea that an adequate organization and financial support would be necessary if curriculum planning were to become effective. Initial discussions of a proposal for broad study of medical education were begun with representatives of the Commonwealth Fund of New York in the fall of 1948. The conversations were rather vague because of our inability to define precise objectives and methods, but these discussions did help significantly in convincing us that a very thorough re-examination of educational philosophy and procedure would be valuable.

In 1950, the Commonwealth Fund appropriated \$435,000 for a five year project. At that time it became apparent to our faculty that we could no longer stay in that popular and comfortable stage of conversation about curriculum planning — that we would have to go to work. Dr. Ham will describe the program which has evolved since then.

In concluding this summary of the background of the program at Western Reserve I would like to point out that the school had a fortunate combination of circumstances — strong leadership, senior faculty interested in teaching and accustomed to cooperative efforts in research, and adequate financial support for a comprehensive study of educational problem.

It is equally important in this conclusion to point out that these local circumstances came at a time when many other individuals and faculties in medicine and associated professional disciplines were concerned about the objectives of education and the methods being used to attain them. It was apparent that the Western Reserve activity was only one manifestation of a nation-wide ferment arising from the desire to make more effective use of human resources by providing educational opportunities designed to develop fully the capacities of the individual.

Entering upon an experiment at this time, it was inevitable that our faculty should concentrate attention on the processes of education and on efforts to develop appropriate attitudes and motivation in the students as well as an integrated knowledge of body

structure and function. From this faculty effort has emerged the strong conviction that the medical student is in fact a graduate student capable of increasing responsibility for his own education; that the medical student is a human being who is as much entitled to treatment as a whole person as is the patient; that as a person the student needs to grow in an atmosphere that is conducive to the development of constructive attitudes and motivation, and that a sound educational program must provide guidance in the selection and pursuit of long range objectives as well as in the acquisition of facts and techniques.

DR. WEARN — Dr. T. H. Ham will discuss the evolution of a curriculum by democratic methods. Dr. Ham, as you know, has been studying curriculum at Harvard, where he made some interesting changes in the teaching of laboratory diagnosis in the second year.

Directly after he came to Western Reserve, we heard that the School of Medicine had appointed a "dictator" who would take over all the professors and would thereafter run the departments as he saw fit. Conversely, the program has been evolved by a democratic method that has gained the confidence of the entire faculty, since the youngest instructor, or even a resident, intern or student may criticize or contribute to it.

#### *The Evolution of a Curriculum by Democratic Methods*

DR. HAM — It is with considerable humility that the program of medical education has been initiated, discussed and evolved. This presentation is divided into three long range considerations:

First, the democratic methods which are being used to evolve the program; second, the basic principles of the program which will ever be changing; and, third, the method of administration of a program which has not been tried in exactly this form before.

In this narrative account it should be realized that the planning for this program began many years ago, at least in 1945. However, the entering class was the first to initiate the program, which is only one semester old. As this class proceeds in its second, third and fourth years, the program will advance with this class, so that one cycle will have occurred by 1956. Accordingly, about ten years will have elapsed from the beginning of the planning to the gradua-

tion of the first class under the program. Still another ten years will be required to evaluate the program. This presentation is a progress report of preliminary data. Since the experiment is new, material has not been published.

The democratic methods by which the program was evolved will be described first. The General Faculty, which is made up of 200 members of the teaching staff, is responsible for the policy of the instruction and for inter-departmental cooperation. The Committee on Medical Education serves the General Faculty, and has one representative from each department, who serves a period limited to four years. Since each member is appointed by the director, this has given true representation and good communication for each department. It has given the opportunity for differing opinions to be expressed, to be expressed with vigor. Most important views have been presented in writing, and the Committee on Medical Education has become a senatorial forum on medical teaching. There has been free debate but effective action by this group for the General Faculty. The concept of interdepartmental collaboration in teaching had been accepted for several years at Western Reserve University School of Medicine so that the faculty was ready to consider changes of a major sort.

To initiate the planning, each department was asked by the Committee on Medical Education to submit in writing a description of the following: the current program, criticism of the program, proposed plans for the future, subjects in which there was duplication and overlap, and where it might be advantageous to collaborate with other departments, and also the relation of the broad programs of medical education to their own department.

Departments embarked upon this analysis found that there was considerable debate within the department and that many issues remained open for continuing discussion. However, there was obtained from each department a written report which was discussed and the discussion recorded. These data were reproduced and distributed to the faculty. This served as a definitive way of communication so that the clinician could know the plans and program of the biochemist, and the preclinical faculty could know about the clinician. The faculty not only planned, but listened to one another.

Immediately it became apparent that one could not begin by dis-

curring curriculum and that curriculum was the last and the final resultant of all the other considerations. There was willingness on the part of the faculty, even though difficult, to discuss a series of steps leading to the curriculum. First, there was the mission of medicine itself, then the objectives of medical education which would carry out this mission. From such objectives one could choose and define the faculty and its relation to the students and then the educational methods themselves. Much attention has been given to educational methods, as already emphasized by the Chairman of this meeting. There was then considered the medical aspects of the educational program, the facilities required, and lastly the curriculum. The curriculum is the course through which the student travels and is a definition of limitations as well as opportunity.

To return to the objectives of medical education, it was agreed to give a basic education to the doctor to become either a family physician, specialist, teacher or investigator. The mission of medicine itself includes the care of the patient, prevention of illness and rehabilitation of the patient and research and teaching.

Learning the approach to solve the problem of the patient or of biologic nature was considered to be a major objective in medical education. Learning basic principles, learning methods of study, learning the right attitudes to patients, and professional colleagues, are important educational objectives.

It is immediately apparent that coverage of available information is impossible. If this can be accepted, then emphasis can be placed on learning basic principles, methods, the scientific evaluation of data and clinical evaluation of patients. It was agreed by the faculty of the School of Medicine at Western Reserve that it would experiment with correlation in the teaching of the biology of man, the principles of medicine, and care of the patient.

For this experiment it was agreed to try interdepartmental teaching, in which there was cooperative planning, cooperative presentation of lectures, laboratory, conferences and clinical exercises. Accordingly, subject committees were formed by persons from departments concerned with the teaching of a field.

Another objective in the method of education was taken from

the preceding two centuries: namely, a prolonged contact of the student with a preceptor in basic science and in clinical medicine.

The educational environment is believed to be so essential to the learning process that it has been given emphasis throughout. The program has been designed to treat the student as a maturing individual, as a colleague, and as a member of a professional graduate school, with increasing responsibility for his own education, for knowledge of medicine, and for care of patients.

Also, an attempt is being made to arrange the examinations so that they supplement rather than conflict with it, to arrange a mature system of grading, and to encourage the initiative of the student by giving him free time in each year to carry out elective studies. These are broad concepts that have been translated into definitive plans for the program.

Concerning facilities for students, it was immediately apparent that a multi-discipline approach to the teaching of a subject would require a unit in which multiple disciplines could be carried out. Accordingly, a multi-discipline laboratory was planned and is in operation, where the student may carry out procedures of the several preclinical sciences as well as research. The student occupies the same unit throughout the year. It is always available to him during day or night so that it is his own place for work or study. Possibly in the future, a clinical facility might be designed in which the student could have more continuity in following patients in the hospital, outpatient and home.

Considering the curriculum itself, Phase 1 has been in operation currently for the first term. It is the course for the first year and is a study of normal biology of man, with emphasis on biochemical activities of the body, structure, function, growth and development, with a study of organs and organ systems rather than separate disciplines. The student is introduced to the normal patient, normal infant, family, and the behavior of man as a member of society.

Phase 2, which represents the second and third years, is still being planned. During this period there will be emphasis on the principles of medicine, prevention of disease, mechanism of disease and natural history of illness. Diseases of organs or systems will be taught instead of separate disciplines. Patients will be studied

increasingly for diagnosis, for definition of principles concerning the mechanism of the illness and of treatment.

In Phase 3, an attempt will be made to apply the biology of normal man and the principles of medicine to the care of patients in the hospital, outpatient department and home.

Administratively, the departments have maintained their personnel and their review of the material that is taught but have agreed to allow collaborative teaching by members of their departments. The actual teaching is conducted by the subject committees under a coordinator for the particular phase, such as Phase 1. The policy of the program of medical education is being worked out through the General Faculty, through the Committee on Medical Education, and through certain subcommittees of the Committee on Medical Education. Dr. Patterson, who is coordinator of Phase 1, will describe its operation.

DR. WEARN — Dr. John W. Patterson, Associate Professor of Anatomy and Coordinator of Phase 1, and actual administrator of the changes that have taken place, will tell us about the program for the first year. Dr. Patterson is now Associate Dean of Medical Education and Dr. E. E. Selkurt is Coordinator of Phase 1.

*Phase 1. The Program for the First Year, 1952-1953*

DR. PATTERSON — I would like to summarize the high points of the material pertinent to Phase 1 that have already been covered. Phase 1 is concerned with normal structure, function, growth and behavior, and the introduction of the student to the patient-physician relationship.

Phase 2 is concerned with alterations of the above, and the study of disease.

Phase 3 is concerned with the actual care of the patient.

To highlight the purpose of a curriculum, I would like to point out three primary objectives: First, to obtain a basic skill and knowledge; second, to develop proper attitudes toward man and his relationship to the community; and third, to develop habits of self-education.

In preliminary discussions of the old curriculum, the three major criticisms centered around each of the three basic objectives.

Concerning basic knowledge and skill, it was noted that there was a hiatus between the basic science group and the clinical science group. The basic scientists felt that they were teaching the students the most recent findings from the literature, while, the clinicians, being unfamiliar with it, were letting this knowledge go to waste.

On the other hand, the clinicians felt that the basic scientists were teaching the students research material that was not particularly pertinent to medicine and that the clinician had to teach the practical aspects of the basic sciences.

A second objection was related to the fact that man was not considered as a whole. In the medicine clinic the student knew the patient had some disease related to internal medicine, and on the surgical ward the diagnosis had to be consistent with a surgical disease. Furthermore, the social, economic and psychological factors pertinent to a given case were often neglected, either because of a shortage of time or a lack of interest.

Third, there was a major objection on the basis that our educational methods were based on what has been known as "spoon feeding," the highly organized lecture and laboratory experiment. The latter were described by some as being "cook book" in type.

The three basic parts of Phase 1 are related to the objectives:

1. Basic science teaching.
2. Clinical science teaching.
3. Those aspects pertinent to self-education.

I would like to go into each of these in a little more detail.

The basic science material of Phase 1 is presented in a correlated manner by subject committees. The subject committees are made up of representatives of the various departments, and are assigned a given amount of time for the presentation of a certain subject.

The Orientation Committee was responsible for orienting the student to his career in medicine, and more particularly to the years he would be spending in medical school. Three days were spent on these sessions.



## EXPERIMENT IN MEDICAL EDUCATION 121

The subject committees of Phase 1 are as follows:

### *Schedule for Phase 1, 1952-1953\**

Orientation .....	Sept. 18-20
Introduction .....	Sept. 22-27
Cellular Energy .....	Sept. 29-Oct. 10
Cellular Structure .....	Oct. 11-Nov. 5
Cell Growth and Development .....	Nov. 7-Nov. 18
Exam .....	Nov. 19
Locomotion .....	Nov. 21-Nov. 26
Thanksgiving Vacation .....	Nov. 27-Nov. 29
Locomotion .....	Dec. 1-Dec. 6
Nervous System .....	Dec. 8-Dec. 20
Christmas Vacation .....	Dec. 22-Jan. 3
Nervous System .....	Jan. 5-Jan. 12
Blood Capillaries and Lymphatics .....	Jan. 13-Jan. 21
Exam .....	Jan. 23
Respiratory System .....	Jan. 24-Feb. 3 (1:00 P.M.)
Heart and Large Vessels .....	Feb. 9 (2:00 P.M.)-Feb. 28
Digestive System .....	Mar. 2-Mar. 18
Exam .....	Mar. 20
Liver .....	Mar. 21-Mar. 28
Spring Vacation .....	Mar. 30-Apr. 4
Liver .....	Apr. 6-Apr. 13 (1:00 P.M.)
Endocrine Systems .....	Apr. 13 (2:00 P.M.)-May 1 (1:00 P.M.)
Kidney .....	May 1 (2:00 P.M.)-May 16
Reproductive Systems .....	May 18-May 29
Memorial Day .....	May 30
Exam .....	June 1
Comprehensive Exams .....	June 8-June 13

The program then develops at a cellular level. The introduction to the cell is a joint effort of the following three subject committees that consider cellular energy, cellular structure and cell growth in more detail. This introduces classical biochemistry and cytology, with a small amount of microbiology.

Following that, the Locomotion Committee brings in the disciplines of anatomy and physiology along with the histology and biochemistry. Gross anatomy in Phase 1 is limited to approximately 80 hours. Dissection in Phase 1 is done on the infant cadaver. The major part of gross anatomy and the dissection of the adult cadaver is postponed so that it may be correlated with medicine and surgery in the second and third years.

The subject committees each integrate biochemistry, histology, gross anatomy, and physiology.

\*During the year, 1953-54 the subjects listed here were consolidated for administrative purposes into five larger categories: Cell Biology; Tissue Biology and Neuro-muscular Systems; Cardiovascular and Respiratory Systems; Metabolism (G. I., Liver and Kidney); and Endocrines (including Reproduction).

There are no text books organized in this way, therefore, it has been necessary to select standard text books and to correlate the material of these books by printing a syllabus with references.

The clinical science section of Phase 1 has to do with the introduction of the student to the patient-physician relationship. It is oriented around a laboratory problem. Each student, during the sixth to eighth week of school, is introduced to a patient in the ante partum clinic. These patients are selected so that the expected date of delivery is in approximately one month. The student has a chance to talk to the expectant mother, to visit the home, to follow her course, to observe the delivery, and then to follow the course of the infant and mother following delivery.

Integrated with this laboratory problem are sessions of didactic material given in lectures, movies, or discussion groups. This material is divided into five areas.

First there is a short period considering the emotional nature of man. It is then followed by a consideration of the interview and the patient-physician relationship as preparation for the first contact with the mother. The third area deals with the milieu in which the infant grows, and the fourth with physical examination.

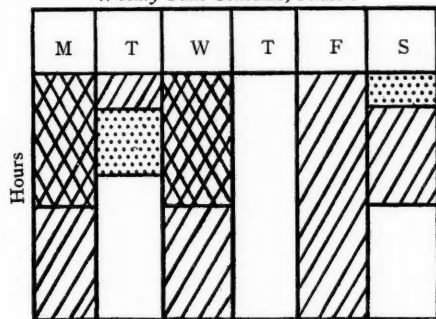
Physical examination correlates with the basic science material. It starts at the time the nervous system is being considered, and follows through with the circulatory, respiratory, and digestive systems. There are ten two-hour sessions devoted to physical examination.

The fifth area is concerned with the personality, growth and development of the infant.

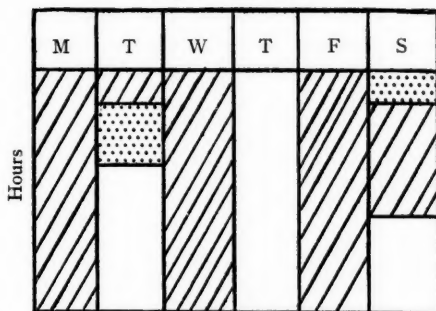
Preceptors work with the students in the clinical science program. One preceptor works with a group of eight students throughout the first year. He attends all lectures in the clinical science portion, sees all the movies, meets once a week with his group of students to discuss their problems, and stands as an example to the student throughout his first year while he is being introduced to the patient-physician relationship.

There are four parts of Phase 1 which contribute to starting the student in a process of self-education. First, a familiarity with medical literature. During the first seven weeks the librarian

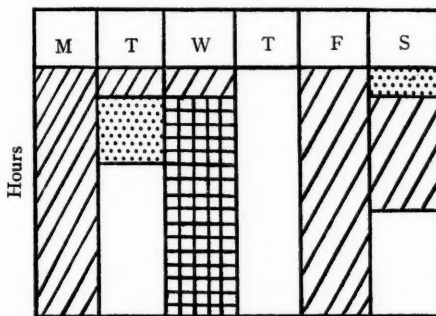
*Weekly Time Schedule, Phase I*



Sept. 22 — Nov. 8



Nov. 10 — Jan. 31



Feb. 2 — May 30



meets with groups of twelve to fourteen students one hour each week, to discuss such things as the cataloging of books, abstracts and indices of medical and basic science material, treatises, and the journals of medicine and basic science areas. Between these sessions the students work out problems so that they will become familiar with the literature by using it.

The students have five hours each week during the first seven weeks to consider biostatistics as one method of scientific critique. The idea is not that the students will become biostatisticians, but rather that they will be familiar with the value of a control and the relative difference between two sets of data.

In order that the student may be familiar with the methods which are used in obtaining much of the material that is presented to him in the basic science area, it is felt that each student should have a chance to work on a project so that he will learn to use the literature, to develop a hypothesis, to design an experiment that will test the hypothesis, to do that experiment, to collect the data, to evaluate it, and to present it to his colleagues. Therefore, during the second half of the year one day each week has been reserved for project study.

The curriculum at Western Reserve in previous years, has been such that the initiative of the student has had little chance to develop. The student has gone to classes from nine in the morning until five in the evening, five days a week, plus a half day on Saturday. There was little time to do anything else. On those occasions when there was free time, it was arranged as an hour here or an hour there, and the first reaction was to play bridge until the next class came along.

Therefore, a definite effort has been made to give the student free time in which he can develop his own interests on his own initiative. A day and a half, Tuesday afternoon and all day Thursday, is scheduled throughout Phase 1 for this purpose.

In connection with this, a tutorial or advisory system has been organized. Each student selects a tutor who may be consulted for advice regarding the use of free time.

There are two aspects which Dr. Ham has mentioned which are particularly pertinent to carrying out Phase 1, and were con-

sidered essential for the success of the program. One of these is environment. In 1951-1952 the freshman students had sixteen examinations during the first year. The sophomore students had thirty examinations during the second year. The latter is an average of one examination every week. The motivation under this system was quite clear. As soon as one examination was over, it was time to start getting ready for the next. Examinations represented a series of hurdles.

In order to change this environment, the subject of examinations and grading was reconsidered. In Phase I there are two types of examinations—first, the interim examinations of which there are four, and secondly the comprehensive examination scheduled at the end of the year.

The interim examinations are given anonymously, and grades are not recorded against a student's name. The answers to questions are graded either "Satisfactory" or "Unsatisfactory" and returned to the student. In this way the students can evaluate their performance, and the faculty can determine what they have been able to accomplish.

The comprehensive examination at the end of the year, will be graded and become part of the student's record.

The second item which is considered essential for the success of the program is the multi-discipline laboratory, where the student can carry out the experiments designed by subject committees. Furthermore, this laboratory provides the student with a home base where he can do experiments during his free time, if he so desires.

The curriculum is actually a small but important facet of medicine, and if it is to fulfill its function in the best way it should help to produce good doctors, those with adequate knowledge and skill, with the proper attitude toward man as a whole, and with habits of self-education which they can carry on through an active career.

At Western Reserve School of Medicine we have instituted certain changes which we hope will bring about the desired objectives. The initial plan undoubtedly will have to be modified as we learn by doing, but it is felt that the over-all approach will

provide an opportunity for the students to get the proper start on their individual missions in medicine.

DR. ORBISON\*—As the new curriculum of the School of Medicine enters the second year, this report is prepared to acquaint the readers with the aims and specific plans for this second year, or Phase 2a. It is hoped that the program presented in this report will accomplish the proposed objectives: that the students will have broadened their interests and increased their initiative by the constructive use of free time; that they will have increased their knowledge of behavior, growth and development, and will have taken increased responsibility for diagnostic methods in the study of patients as a result of the clinical science studies; that they will understand the methods used by both biologic and clinical science in the investigation of disease; and that they will have attained a solid basic knowledge of the principles of medicine by the presentation of an integrated study of disease by the subject committees.

To attain these objectives, the time of Phase 2a has been divided into four principal parts: (1) that devoted to teaching by the subject committees; (2) that devoted to clinical science; (3) that devoted to the bioclinical study section, and (4) that given over for free time. The approximate amounts of time given to each of these and the approximate schedule of each is presented in table form below.

The subject committees of Phase 2 have as their principal responsibility the presentation of the abnormalities of structure and function which make up disease. To fulfill such responsibilities, the membership of the subject committees in Phase 2 is, in general, broader than in Phase 1 because of the addition of members of the several clinical science disciplines. Hence, disease is presented from many aspects so that etiology, mechanisms of injury, mechanisms of symptom production, clinical features, diagnosis and treatment can be studied as an integrated whole. In fact, it is believed that such integrated presentation of disease processes is one of the major accomplishments of this program. To attain this integration, all of the clinical science specialties and basic

\*Reprinted from the Alumni Bulletin, School of Medicine, Western Reserve University.

*SCHEDULE FOR PHASE 2a, 1953 - 1954*

## I. SUBJECT COMMITTEE TEACHING

—approximately 26 hours per week

Introduction to Disease	5 weeks
Infectious Disease and Chemical Agents	6½ weeks
Cardiovascular Disease	4 weeks
Respiratory Disease	2 weeks
Hematopoietic Disease	3 weeks
Gastrointestinal Disease (Includes Liver and Pancreas)	6½ weeks
Diseases of Urinary and Male Genital Systems	4 weeks
Diseases of Female Genital System	2 weeks
Diseases of Skin	1 week
Psychiatric Disease	1 hour per week for 28 weeks
Legal Medicine	1 hour per week for 16 weeks

## II. CLINICAL SCIENCE TEACHING—

approximately 4 hours per week

Physical examination of the normal and lec- tures on special ex- aminations	5 weeks
Examination of Patients	24 weeks
Family study:	
Conference with pre- ceptors	½ - 1 hour per week throughout year
Family clinic visits	1 per month

## III. BIOCLINICAL STUDY SECTION

4 hours per week  
for 12 weeks, 2nd  
semester

## IV. FREE TIME

12 hours per week  
throughout the  
year

science specialties contribute to the program as their special knowledge and skills are required.

Subject committee teaching in Phase 2 can be grouped roughly into four categories. The first category is exemplified by the first subject committee where general concepts of disease and

disease processes are presented. Included are the general concepts of health, injury and disease, and the factors which modify the incidence and course of disease. In addition, the types of injurious agents, their mode of action and the types of reaction of the body to these injuries are presented, but without specific diseases as the major focus. The second category might be considered as the study of disease from the standpoint of the etiologic agent. Into this category fall the study of infectious disease and the study of chemical agents, although the latter study includes general pharmacologic principles as well. The third and largest category embraces the study of disease as it involves specific organ systems. It is during the presentation of these subject committees that the dissection of the adult cadaver will be done, studying the anatomy of each system as the diseases of that system are considered. The fourth category includes those diseases and disturbances in function which involve or are the result of interrelated disturbances of several systems, for example, collagen diseases, metabolic diseases and abnormalities of electrolyte and fluid balance.

Two subjects have been organized in a manner different from that described above. One of these is psychiatry and the other is legal medicine. In each instance, these subjects have been given an allotment of one hour each week for lecture. It is in this time that the specific problems of legal medicine and clinical psychiatry will be presented. In addition, the department of psychiatry is working with the subject committees to present the emotional problems relating to specific diseases.

Because the didactic and laboratory presentation of disease given over to subject committee teaching was too great to complete in the second year, several subjects will be postponed until the third year. Those subject committees which will teach the third year are: Nervous System Disease and Neuroanatomy, Locomotor Disease, Endocrine Disease, Diseases of Special Senses and Metabolic and Pansystemic Disease.

The Clinical Science teaching in Phase 2a is designed to foster the study of the problems presented by patients. The student will carry out these studies on the hospital wards, in the family clinic and in the home. The clinical science teaching is to be dis-



tinguished from the subject committee teaching. The subject committee presents disease by didactic and laboratory methods and uses patients to demonstrate a specific disease, whereas the clinical science teaching uses patients, regardless of their illness, as problems for the student to solve. The three principal subdivisions of the clinical science teaching are: (1) the continuation of the family study and family clinic begun in Phase 1; (2) study of history-taking and practice in physical examination of the normal, and (3) the study of patients on the hospital wards. Students are divided into groups of eight, each group having a preceptor at the University Hospitals and also a preceptor at either Crile Veterans Administration Hospital or Cleveland City Hospital. The preceptors at the University Hospitals have the responsibility of acting as advisors for the family study and family clinic as these continue throughout the year. The time for following the family in the home is arranged by the student in extracurricular time, whereas the time for the family clinic visits is taken as needed from subject committee time. The preceptors at University Hospitals also have the responsibility for guiding the students through the five 4-hour periods of physical examination of the normal. For the study of patients on hospital wards (four hours per week for 24 weeks), the groups of eight students are further divided so that four will work under a preceptor at University Hospitals for two weeks, while the other four work under a preceptor at Crile or City. The student assignments are then reversed, the alternating assignments continuing throughout the 24-week period. It should be stressed that this whole enterprise is proposed to increase the ability of the student to study carefully and accurately the problems of patients by history, physical examinations, laboratory studies and discussion, and is not intended to give experience with a large number of disease entities. A carefully written report on each patient will be presented to the preceptor for evaluation.

The bioclinical study section is designed to allow students the opportunity to study a selected disease in detail or to gain more experience in a selected department. It is also designed to illustrate the contributions of both the biologic sciences and the clinical sciences in the study and elucidation of disease. To accomplish

these objectives, each group of students will be under the supervision of a faculty team composed of one member from a basic science department and one member from a clinical science department. This team will select the disease process to be studied by their student group. The details of the teaching procedures are left to the instructors, but it is expected that the students will study patients, search the literature for information, carry out limited laboratory procedures and report, either by conference or in writing, to the faculty team.

Free time for the students is retained throughout the second year and is to be used by each student as he thinks is best for his particular needs. It is believed that free time allows the student an opportunity to develop his own initiative by his own interests. He may engage in research activities, take elective courses, study the curricular material assigned or undertake any other activity he desires. In view of the opinions of the students and faculty at the end of last year, tutors are optional with the students.

The new facilities planned for construction on the roof of the medical school building were delayed because of shortage of materials. It became necessary, therefore, to construct temporary facilities for the Phase 2a students in the Institute of Pathology. By using the laboratory already present in Pathology for most of the student work and converting a small classroom and locker room into space for experiments in pathologic physiology, satisfactory laboratories were provided. In the meantime, work has progressed on the new facilities at the medical school, and it is estimated that these will be completed early in 1954. These new facilities are designed to house six multi-discipline laboratories, each with a capacity of 16 students, and space for store rooms and animals. This laboratory, as in Phase 1, is so arranged that each student will have working space in which he can do all of the assigned laboratory procedures. However, with the separation into six rooms, it is expected that there will be an increase in the contact between students and instructors and that small group conferences will be more readily conducted.

Thus it is seen that Phase 2a is beginning a program aimed at presenting the processes of disease in such a manner that the

special knowledge of the various biologic sciences and clinical sciences can be readily interwoven to complete the whole pattern of any particular disease under consideration. How successful we shall be in this first attempt can only be determined by experience. We can expect at least that this experiment in teaching methods will be sufficiently instructive that continued improvement can be made by the experience gained.

### *SUMMARY\**

DR. HAM — The amount of time that will be given to teaching of clinical medicine will be just about the same as it has been under the previous curriculum. The amount of time given to the biologic sciences is approximately the same. The differences are ones of emphasis. For example, from Day 1, the student thinks like a physician, instead of waiting until his third year. He is required to observe, evaluate, write, conceive and behave the way a doctor does. He is trained in the scientific method and to think as a biological scientist. Continuously he is given the initiative and responsibility to think for himself in his free time, projects and bioclinical studies. In this way he has the opportunity of educating himself as is required during his next four years.

Although the plans are not set completely, it is hoped to keep these emphases throughout four years. Thus the basic scientist has requested the opportunity to present material in the last year just as the clinician has presented patients in the first year.

This is only a progress report on a program in which there is an opportunity to experiment in education in the important field of medicine. Obviously changes will be required as the curriculum advances. The experiment will be recorded with care and evaluation will be attempted as methods are evolved. It is hoped that an opportunity may be given in the future to report again to this Association of the progress of the experiment.

### *DISCUSSION\**

PRESIDENT BONNETT — Dr. Ham will be very glad to answer or discuss any questions you wish to bring up.

\*The Summary and Discussion were given at the meeting of the Association of Life Insurance Medical Directors.

DR. RICHARD B. SINGER — I have two questions of Dr. Ham on this extremely interesting experiment.

I wonder, first, about the reaction on the part of the faculty, in giving the necessary time for this new program. First of all, it meant a great expenditure and increase in the time which they formerly devoted to teaching, and which time was probably taken away from research or practice.

The second question is: how is the teaching coordinated in the laboratory, and what has been the function of this laboratory, and how has the material been selected?

DR. HAM — These are pertinent questions, Dr. Singer.

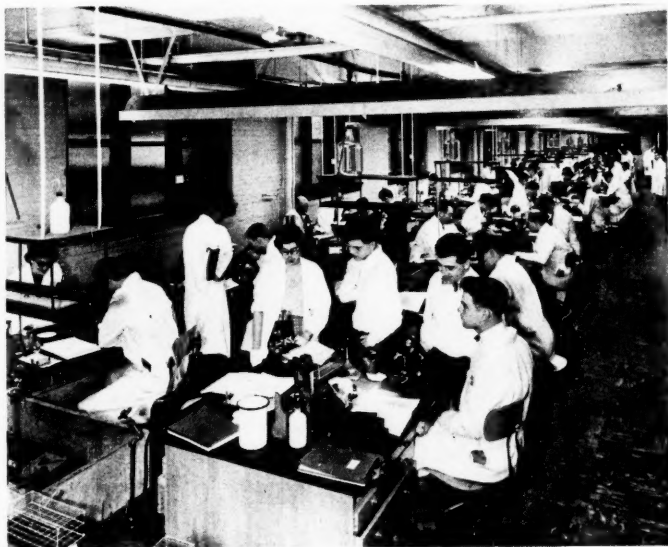
The amount of time that has gone into the planning of this program is enormous during the past three years, and has involved large numbers of the faculty. It is comparable to changing over from manufacturing one model to another. Now that the first year has been given under the new program, there appears to be less tension and more understanding of the objectives and suggested methods.

Concerning the teaching time, fortunately, no one has been able to change the length of the day. The total number of curriculum hours in four years has remained about the same and the ratio of students to faculty is similar to that of the past. Also, the teaching load has been spread to more members of the faculty with this system. There are many members of the medical school and hospital who had not contributed significantly to the teaching. These men may be doing excellent work in research or in laboratory service and now can add to the teaching more readily than in the past.

Medical students have been employed for the first time as regular teachers. Last year seven fourth-year students elected to teach for eight weeks each. This is comparable to the contribution made by the Ph.D. students who have taught regularly. The fourth-year medical student is paid \$50 a week for his full time teaching so that \$400 may be earned for the teaching period. This year twenty-one seniors have volunteered to teach at some time during Phase 1 or Phase 2a. This is an excellent investment of \$8,400 because the student instructors bring an enthusiasm and

an ability to speak to the students that the Ph. D. student has brought to his colleagues in the years gone by.

Concerning the laboratory, it is quite remarkable that the faculty now has to come to the student. The student possesses the laboratory rather than a temporary desk in the professor's department. Thus a group that is studying cell biology, will conduct experiments with micro-organisms in which they show the effect of penicillin on the growth of mutants produced by ultra violet radia-



**Phase 1 Laboratory for Eighty Students**

This large laboratory is experimental in design. It permits each student to occupy his own laboratory space for the whole year and at any time. Multiple disciplines are carried out by the students working in pairs or in larger groups. Each student has approximately 36 square feet of space, and shares with a partner a movable table at which all procedures are done, including microscopy. Each section of eight students can be separated by a folding curtain. The tables can be pushed to one side to provide a small conference room. For each of two sections or sixteen students, there is a blackboard, reagent shelf and space for roll-in equipment such as a large centrifuge or incubator.

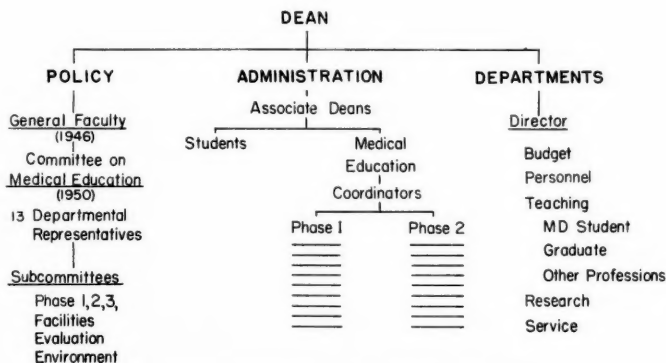
tion. The experiments are planned and tried in advance. The Laboratory Manager then arranges for apparatus, reagents, incubators and cultures so that they will be available for a necessary period.

During this period, however, the students may also study the histology and biochemistry of certain mammalian cells, the morphology of certain micro-organisms, including staining reactions, mobility, growth, characteristics and nutritional requirements in different types of media. The student may conduct himself as any investigator in his own laboratory with equipment for chemical and biologic experiments. Also the mobile tables are brought together for various experiments, are put together for observa-



Pilot Laboratory for Phase 1 Students

This small laboratory for eight students has served as a pilot model for future construction. It differs from the large laboratory since it allows about 50 square feet per student and each student has a separate writing desk which is used for microscopy. He shares a sink and a movable laboratory bench at a stand-up height of 36 inches. Common reagents are available at the end of the room. This unit has had the advantage of privacy, larger space and the separate desk.



### The Organization of the School of Medicine

As indicated in the diagram, the thirteen departments of the School of Medicine are responsible for all faculty personnel and are represented on the Committee on Medical Education which is responsible to recommend policy to the General Faculty concerning curriculum. The program of education, when approved is carried out by subject committees in Phases 1 and 2, and in the future by Phase 3. Each subject committee is directed by a chairman and is composed of members of different departments as agreed to by the directors of the departments. The Associate Dean of Medical Education provides administrative leadership and certain centralized services such as management of the laboratories, stock rooms, and production of syllabus material. The Coordinator of Phase 1 and of Phase 2 serve as leaders for the chairmen of subject committees of their respective phases and of an executive committee composed of the directors of departments that are most concerned with the particular teaching program. This organization is in itself experimental.

tions on the students themselves who act as their own subjects in selected studies concerning cardiac function and physical examination.

**PRESIDENT BONNETT**—It is quite a comment on medical education when doctors and educators, who tend to be conservative, undertake a fundamental experiment in education. Dr. Ham thought that there might be some controversial discourses here and discussion.

**DR. GEORGE McLEAN**—This program evidently is geared to full-time teachers. Where does the part-time clinician figure in the planning?

DR. HAM — One of the promising aspects of the first year is the contribution of the clinical preceptor comparable to our colleagues of a century ago, when the student learned by being apprenticed to a preceptor for three years at \$100 a year for tuition. The practicing physician is serving as clinical preceptor, meeting with the same eight students for an hour at least once a week for the first year. In the second year he meets a different section of eight students for at least one afternoon a week throughout the year. The preceptor gets to know these students remarkably well. There are thirty clinical preceptors who include full-time and part-time internists, pediatricians, an obstetrician and a surgeon.

PRESIDENT BONNETT — Is there any further question?

Thank you again, Dr. Ham, very much indeed.

Mr. Lew's opening review yesterday called attention to a mounting problem — that of carcinoma of the lung. You have seen as recently as last week discussions in the daily press, and also in medical literature, on the possible cause for the apparent or, as we suspect, real increase in lung cancer in the past few years.

We now have the privilege of hearing Dr. E. Cuyler Hammond discuss, "Possible Etiologic Factors in Lung Cancer." Dr. Hammond, in addition to being Director of the Statistical Research Section of the American Cancer Society, is Professor of Biometry, Graduate School, Yale University.

It is a pleasure to introduce Dr. Hammond.



## POSSIBLE ETIOLOGIC FACTORS IN LUNG CANCER\*

E. CUYLER HAMMOND, SC. D.

*Director of Statistical Research Section*

*Medical and Scientific Department*

*American Cancer Society*

*New York, New York*

*and*

*Professor of Biometry, Yale University*

*New Haven, Connecticut*

The annual number of cancer deaths in the United States is steadily increasing, but this is due in large measure to the growth and aging of our population. After adjusting for age, it is seen that the cancer death rate among females has been going down since about 1936. We have reason to believe that this is attributable to a combination of more effective therapy and earlier diagnosis made possible through public health education. On the other hand, among males age-adjusted cancer death rates are rising.

Most of this increase, however, is due to the surprisingly rapid increase in deaths from cancer of the lung. A few decades ago the occurrence of bronchiogenic carcinoma was seldom observed but by 1942 it claimed the lives of 8,800 Americans. Only ten years later it is estimated that 21,000 of our people died of this cause. The most alarming fact is that the upward trend shows every indication of continuing.

For the present, at least, the problem is more serious among men than among women. About 2,200 women died of lung cancer in 1942 and 3,600 in 1952. By comparison, the lung cancer death figures for men were 6,600 in 1942, increasing to 17,400 in 1952. The highest incidence rates in males occurs in age group 60 to 70 and in females in age group 70 to 80. Most authorities are under the impression that almost all the increase has been in epidermoid type of carcinoma.

City dwellers seem to have a much higher incidence of these tumors than do inhabitants of rural districts. Among males, the death rate is more than twice as high in urban areas than in rural

\* Condensation of the paper presented by Dr. Hammond at the meeting of the Association.

areas. However, it should be noted that these figures are based upon death certificate reports. The possibility exists that the differences noted above are due to errors in diagnosis and errors in specifying place of residence which combined may perhaps result in under-reporting in rural areas.

There is evidence that some cases of lung cancer have resulted from the exposure of industrial workers to dust or vapors containing such substances as arsenic, nickel, chromate, asbestos, radioactive substances, and coal tar fumes. However, there is little indication that occupational exposure to such substances has caused many cases of lung cancer in the United States. It seems most unlikely that industrial exposure could account for any large proportion of the lung cancers now occurring.

To account for the tremendous increase in this type of malignant neoplasm it seems that we must look for some factor, or combination of factors, which affect the general population rather than only a few highly specialized occupational groups. Furthermore, it would seem logical to be most suspicious of certain factors in the environment to which the public has been increasingly exposed during the last several decades. In addition, we might look for substances to which city people are more heavily exposed than country people and to which males are more exposed than females. We must also remember that there may be a delay time of as much as twenty years between exposure and clinical appearance of the disease.

Since we are dealing with a disease of the lungs, most attention has been given to substances which are inhaled. Among the numerous factors which have been suggested, at one time or another, the following four stand out most prominently.

Coal tar and certain oils contain chemical agents of known carcinogenic properties capable of producing cancer in experimental animals. The concentration of exhaust fumes from automobiles has been increasing greatly ever since 1900; practically the entire population is exposed to some degree; and city dwellers are more heavily exposed than country dwellers. However, this does not necessarily explain the question of sex difference.

The same can be said of the dust from tarred roads which is increasing and contains known carcinogenic agents.

Air pollution in the form of dust and fumes from coal and oil furnaces as well as from certain industrial processes has become a first rate nuisance in many communities, and the degree of exposure is greater in the urban than in the rural populations.

The three suspects named above are all being intensively studied in laboratories but the real question is whether or not the concentrations actually inhaled by human beings are sufficient to cause cancer of the lung, and this can only be discovered by epidemiologic studies on human population groups. Such investigations are both very difficult and very costly, but several are now getting under way. It will probably be a number of years before the results are known—and in the meantime the lung cancer death rate continues to rise.

By far the greatest attention has been given to a fourth factor, namely tobacco smoking. On the face of it this seems to meet most of the requirements for a first rate criminal suspect. The consumption of cigarettes has been increasing dramatically ever since World War I. The habit, as an almost universal custom, started first among men and spread to women at a later date. The tarry products of tobacco smoke have been used to produce malignant tumors when rubbed on the skin of experimental animals. However, I must add that such circumstantial evidence alone should not necessarily lead to a conviction and that other more direct evidence has been accumulating in recent years.

In 1928, Lombard and Doering of the Massachusetts State Health Department conducted a study in which patients were questioned about their smoking habits. A larger percentage of heavy smokers was found among patients with cancer of the buccal cavity than was found among other groups. No mention was made of lung cancer, probably because it was a relatively rare disease at that time.

The next significant study was made by Raymond Pearl of the Johns Hopkins University in 1938. By quite a different method of investigation he obtained evidence which seemed to indicate that heavy smoking produces an appreciable shortening of life expectancy. The volume of material was not sufficient to make an analysis by cause of death. After an initial period of excitement resulting from this surprising report, interest in the subject diminished.

In 1945, the results of a second study of smoking in relation to cancer were published from the Massachusetts State Health Department. This time they found a much larger percentage of heavy smokers among lung cancer patients than among other groups.

By 1950, the lung cancer death rate had increased to such proportions that it stimulated a renewal of interest in the problem and in that year the results of five major and independent studies were published. All of these investigations were conducted by the same method as that used in the original Massachusetts study. This is known as the historic method of investigation. All of them showed that upon questioning, a larger percentage of lung cancer patients report a history of heavy smoking than do control series of persons who do not have lung cancer. However, the order of magnitude of the correlation differed considerably between the studies.

For certain technical reasons, some investigators—myself among them—are not convinced that the methods of procedure used in these studies can be counted upon to yield valid, unbiased results. Most particularly, I am uncertain whether the order of magnitude of the correlation is so small as to be of only academic interest or so large as to be of great practical importance. Principally for this reason we are undertaking a very large-scale investigation of the problem using an entirely different method of approach. It may be described as the follow-up method as distinguished from the historic.

Between January and June 1952, volunteer researchers of the American Cancer Society obtained smoking histories on 204,000 white men between the ages of 50 and 69. Each of these men is being followed at annual intervals. For each death reported, the cause is ascertained from the death certificate. The first follow-up was done about a year ago and the volunteers successfully traced 99.4 per cent of the men originally questioned. If this efficiency can be maintained, we should have enough information to yield a conclusive answer in about one and one-half to two and one-half years from now.

Although our major concern is lung cancer, an analysis will be made for all major causes of death. Perhaps the most im-

portant finding will be the effect, if any, of smoking on the general death rate. If cigarette smoking proves to be seriously harmful, it is fair to assume that the tobacco companies will undertake research to discover the injurious ingredients and remove them from the product; otherwise at least some people may decide to give up the habit.

It is entirely possible, and indeed seems not unlikely, that a combination of factors rather than a single factor is responsible for the increasingly high death rate from lung cancer. Until the final answer is found, all reasonable possibilities should be investigated. The problem is much too serious to risk concentrating all our efforts on a single line of investigation even though at the moment it may appear to be the most promising.

PRESIDENT BONNETT — Thank you, Dr. Hammond.

The number of persons applying for insurance and giving a history of a nervous disorder or current nervous manifestations is increasing daily. Perhaps as a result of the unprecedented recognition of psychiatry by the armed services during the war, a general acceptance somewhat later by the medical profession, and now by the population in increasing numbers, people are willing to admit that they are "nervous" and to seek help. When psychiatric treatment is admitted on an application, we are frequently at a loss as to its significance or to the real nature of the disturbance. Until all of our examiners are basically trained in psychiatry, we shall continue to have this growing problem.

Fortunately, the death rate is not excessive, but we do have the problem of separating from among numerous applicants with nervous manifestations those who are potential suicides and those who are not. Those who are not are almost certainly standard risks. Dr. Peter G. Denker is well known to this audience. He has an excellent insurance background and is keenly aware of this problem. We are particularly fortunate in having him here to discuss, "The Evaluation and Classification of Neuropsychiatric Disorders."

Dr. Denker is Assistant Professor of Clinical Neurology at Cornell University Medical College, and an old friend of most of us here. It is good to welcome you back, Dr. Denker.

## THE EVALUATION AND CLASSIFICATION OF NEUROPSYCHIATRIC DISORDERS

PETER G. DENKER, M. D.

*Assistant Professor of Clinical Neurology,  
Cornell University Medical Center  
New York, New York*

To attempt a rapid survey of neuropsychiatric problems in insurance medicine has required some change of role on my part. Never finding a strong personal appeal in the surgeon's skill, I must admit to moments of ambivalence in preparing this paper, and attempting a débridement of theoretical concepts in psychiatry, hoping to expose, for your interest, more factual data of relevance. Psychiatrists are accused of expressing themselves rather hazily, of being overly-concerned with symbolic interpretation of individual symptoms, and of a lack of scientific precision in their thinking. I have tried to avoid these various pitfalls in the realization that your group is one of practical-minded physicians, more interested in the prognostic data of longevity and disability, than in the pros and cons of various schools of psychiatric thought concerning etiology and treatment. The experience has been a stimulating one, and I am grateful to Dr. Bonnett for the honor of this invitation. Though there is still unhappiness about the vast areas of the unknown, and the limitations of psychiatry, substantial progress *has* been made by this lusty infant of our medical specialties in the past sixteen years when I last had the privilege of addressing your Association on a kindred topic. It is with this data that I am concerned in these remarks and I shall attempt to make a few constructive and practical suggestions.

No matter how one approaches the problem of psychiatric illness, its vast incidence is incontrovertible. According to figures of the American Hospital Association, on any day of the year there are about 650,000 patients in mental hospitals, representing about half of *all* patients in *all* hospitals in the United States. Eighty-five per cent of these patients are in state, 9 per cent in veterans, 4 per cent in county and city, and 2 per cent in private hospitals. In addition, about 120,000 mentally defective and 20,000 epileptic

patients are hospitalized in other institutions, so that taken together the patients in mental hospitals and institutions make a total of about 55 per cent of all patients in all the hospitals of the country. Furthermore, there has been a steady increase in this hospital load in the past 50 years, fourfold in numbers of patients and twofold in ratio of patients to general population. This does not, of course, mean that there has been an increase in *incidence* of mental illness, about which there is some difference of opinion. Most observers feel it rather due to other factors such as an aging population, with more people reaching ages where the psychoses of senility and cerebral arteriosclerosis are more common, as well as an increased knowledge and greater willingness on the part of the public and physicians to have such psychiatric patients hospitalized. And lastly, many more such hospitals have been constructed over the years, making a larger bed capacity available.

The above figures are only for hospitalized cases, but other data similarly point to the importance of mental disorders as a major cause of illness and disability in the nation. It is estimated from sources in various areas that at least 6 per cent of our population is constantly suffering from some type of serious mental disorder. Selective Service records of World War II show that of 18 million men examined for military service almost one million or about 5 per cent were rejected for neuropsychiatric reasons and that of all *medical* discharges, 37 per cent in the Army, and 32.4 per cent in the Navy, were likewise due to these disorders. However, these figures may be somewhat higher than a representative sampling of the total male population of this age group, since the standards for induction were designed to obtain the *best* men available for military service, and also because there were losses to the examined group due to deferments for dependency, occupation, age, voluntary enlistments, and other reasons. In 1951 the Federal Government spent in tax funds about 128 million dollars for maintenance of veterans psychiatric hospitals and treatment, and another 420 million dollars in compensation or pension for veterans' psychiatric disorders.

In civilian life, gastroenterologists have reported that 48 per cent of patients consulting them have no organic gastrointestinal disease. Various similar articles have shown an estimated incidence

of functional cases seen by general practitioners and general clinics of between 35 and 70 per cent, averaging about 50 per cent. In the course of a year about one million patients receive treatment in mental hospitals and at least another 200,000, children included, in psychiatric clinics. State governments spent approximately 560 million dollars in 1950 for their care of the mentally ill, and it has been estimated that the *new* patients who are admitted each year to mental hospitals lose during the course of their illness about \$1,750,000,000 in potential earnings.

Yet, despite the above impressive figures, the entire story is still not told. How is one to assess the generally accepted significance of mental illness or personality disturbance in various social problems? Martha Eliot recently estimated that 1,700,000 children become delinquent annually, and from 250,000 to 400,000 children are brought into juvenile courts each year with such crimes as burglary, vagrancy, homicides and sex offenses being the most common causes of arrest. In *adult* crime, in the single year of 1948, there were 6,500 murders, 8,300 rapes, 26,000 arrests for prostitution or other sex offenses, 700 cases of arson, 2,800 narcotic addicts arrested, and over 180,000 arrests for drunkenness or drunken driving. About one of every four marriages culminates in divorce. There are approximately 350,000 accidents per year and it is believed that 60 per cent of these stem partly from personality causes. Estimates as to the number of chronic alcoholics vary from 2 to 11 million, depending upon degree, and the number of admissions to hospitals for alcoholism and alcoholic psychosis has been constantly rising. Narcotic addiction impairs approximately 50,000 of our population and one of every 1,600 hospital admissions is for barbiturate addiction. This figure, of course, does not include the millions who resort to regular barbiturate intake but have not required admission to hospitals for such habit patterns. Lastly, and of great concern to insurance companies, are the 17,000 suicides annually. The over-all magnitude of this psychiatric problem is really staggering with its implications of human unhappiness, maladjustment, and disaster.

#### CLASSIFICATION

For insurance purposes, it might be helpful at this point to



attempt a simple classification of the more common psychiatric disorders:

1. Psychosis:
  - a) Schizophrenia
  - b) Manic-depressive and involutional melancholia
  - c) Senile and arteriosclerotic
  - d) Toxic or infectious — drugs, alcohol, syphilis, fever reactions, etc.
  - e) Other (trauma, etc.)
2. Psychoneurosis and psychosomatic reactions:
  - a) Anxiety reactions
  - b) Neurasthenia
  - c) Hysteria
  - d) Obsessive-compulsive
3. Psychopathic personalities (drug addicts, sexual perversions, alcoholics, etc.)
4. Miscellaneous character and behavior disorders (adults and children)
5. Mental deficiency

Whether life insurance or disability payments are being applied for, almost all cases could be fairly accurately assigned to one or another of the above categories and it certainly would be most useful if code numbers in your records were adopted accordingly for such a purpose. This would make it far easier to correctly appraise the type and severity of a history of nervous ailment as prognosis and insurability are totally different in the various conditions mentioned. Furthermore, from a scientific viewpoint such a coding procedure would result in homogenous groups permitting subsequent follow-up studies of greater accuracy. I can recall, for instance, when I personally reviewed the files of 1,000 consecutive claims for psychoneurosis at the Equitable Life that all were coded in that manner in the records, yet I found that 293, or almost 30 per cent, were not correctly classified. About half the errors were among psychotic conditions, the other half consisted of a wide range of organic impairments affecting almost every organ of the body, but simulating neuroses in their earliest symptoms. As one might predict, the mortality in this 30 per cent was far above average, whereas in the 70 per cent of true neurotics life expectancy, as is borne out by clinical experience, was as good as or

better than average. Yet all had been dumped into one coding basket which naturally makes one question the value of mortality studies of this type.

Dr. Bonnett was kind enough to provide me with some figures of interest in this regard. In a study completed a few months ago on the impairment called "neurasthenia and nervous prostration", an overall mortality ratio of 113 per cent was experienced in over 100,000 standard issues, and 143 per cent in 29,000 substandard. On breaking down these figures it was apparent that 65 of these deaths were due to suicide with a mortality ratio of approximately 300 per cent in this group which would reasonably account for the increased mortality of the total experience. It was further noted that the greatest mortality occurred in substandard issues within the first five years, and in both groups between the ages of 15 to 29. The answer probably lies in the fact that many cases of psychosis were erroneously included in this series, since suicide is of frequent occurrence in depressions, which may often simulate "nervous prostration" to the inexperienced eye, and conversely, is rare in cases of psychoneurosis. These facts should be borne in mind when passing upon an applicant's insurability, and greater conservatism exercised accordingly, especially if accurate data as to the type of breakdown is not available. Fortunately, the suicide rate among industrial policyholders of the Metropolitan Life Insurance Company reached an all-time low last year of 5.6 per 100,000, being less than in 1951, and far lower than that of the depression years of the early 1930's. Since suicide rates in the past have long been known to rise or fall with favorable or unfavorable economic conditions, let us all hope that satisfactory business conditions continue, thus eliminating at least one factor in the impulse to self-destruction.

#### *REMARKS on PROGNOSIS*

As mentioned above, one can reasonably expect a normal life expectancy in cases of psychoneurosis. Though few such mortality studies have been published, those of cases carefully diagnosed and accurately classified have corroborated this conclusion, and are borne out by clinical experience. They are unquestionably poor disability risks, especially when compensation payments of one type or another are being received. On the other hand, one need

not fear issuing them standard life insurance after a reasonable period of say six months to a year has transpired since recovery. There is one exception, however, to be kept in mind: the obsessive-compulsive neurosis. This type of case occasionally masks an early schizophrenia, or a similarly severe organic brain lesion, and though these cases fortunately constitute only a small percentage of the psychoneuroses, I doubt whether a normal mortality would be experienced among such people. It must further be recalled that with lobotomies being more frequently performed in the past ten years for various types of mental illness, this procedure is being increasingly resorted to in this particular group of cases, thus entailing a further operative risk of significant degree. Greater care should therefore be exercised in this type of neurosis to assure oneself that the condition has not been increasing in severity, that no deterioration has occurred, and that operation has not been advised or contemplated.

Though the role of nervous stress in the various "psychosomatic" ailments is not as yet accurately known, there seems to be little question of its importance in such clinical entities as peptic ulcer, hypertension, arthritis, various dermatoses and other fields. All these associations are being actively explored and discussed these days but in view of our limited knowledge at the present time it would seem to me more advisable to conform with past ratings for the various impairments involved, rather than attempt a new, or added, rating for the nervous element in the situation. Here also, disability features are hazardous and especially so if the precipitating situation of stress is still present.

The question often arises as to how to handle those cases still under treatment for a neurotic ailment at the time of examination. Generally speaking, I would feel it unwise to issue insurance until treatment has terminated and a favorable outcome maintained for six months to a year. Inaccuracy in diagnosis would still be a hazard at this stage, recurrences are unfortunately too common, and the risk of suicide in patients undergoing prolonged analysis is not insignificant. Caution, rather than boldness, should be the motivating element in your underwriting in these situations.

As contrasted with the neuroses and their generally favorable longevity, the problem of dealing with the psychotic cases is, how-

ever, a far more difficult one. These have to be looked upon individually, as each type is of different prognostic outlook and here again diagnosis is all-important. Though generally speaking, schizophrenics, even if in a remission after insulin or electric shock treatments, are in my opinion not insurable. Exceptionally, one does encounter patients who have had an acute psychotic episode, usually after stress, and usually in the younger age groups, with features resembling schizophrenia. If such an episode has been of short duration, with the patient having a history of previous and subsequent emotional stability, as was the case occasionally in the military forces during the past war, the prognosis is favorable and I would not be adverse to issuing limited amounts of insurance on a slightly substandard basis. Otherwise, an accurate diagnosis of schizophrenia in the history merits rejection. Such action should likewise apply in all cases where prefrontal lobotomy has been performed, though this problem is not likely to be too frequently encountered in insurance practice.

Far more common than schizophrenia, however, are the people with a history of a manic-depressive or involuntional psychosis, who, because of their more frequent recovery, are more likely to be applicants for life insurance. Two factors should be kept in mind in underwriting these cases: the hazard of suicide, and the probability of recurrence. This is the group in which suicide is most likely and, as is well known, recurrences more the rule than the exception. For these reasons I would feel an extra rating completely justifiable, even in those cases who seem to have made an excellent recovery which has been maintained for a period of years. Many of these cases will have received electric shock treatments, a form of therapy which has been helpful in terminating the episodes far more rapidly than hitherto. This should not alter the underwriting decision, which should be based on the number of episodes, and the duration of recovery since the illness. Cyclical manic-depressive cases with frequent episodes, alternating between elated and depressed moods, should not be accepted.

Though suicide may occur in any mental disorder, it is by far most common in the manic-depressive and involuntional psychoses. In Jamieson's study of 100 suicides, 65 per cent occurred in this group, 15 per cent in schizophrenics, 9 per cent in psychopathic

personalities, and the remaining 11 per cent scattered through various other classifications. It is interesting to note further that in 61 per cent of these 100 cases, there was a family history of psychosis or suicide. Some authorities consider each case of suicide to be evidence of mental disease, but here again precise definitions seem necessary. Varying figures, between 20 and 50 per cent, are usually accepted as accurately representative of such an association. Certainly, other factors, such as religion, seasonal variations, age, ill health, economic distress and domestic situations all play important roles, and war, strangely, seems to decrease the suicide rate. It has been shown that more women attempt suicide than men, but that more men are successful in such attempts. Motivation in women is chiefly produced by domestic difficulties; in men, by economic adversity. Ill health is equally important in both sexes. Many more interesting relationships could be mentioned, but time is limited so I would refer you to that most interesting volume on the subject by Dr. Dublin, one of your outstanding contributors to the field of insurance statistics, entitled "To Be or Not to Be." It will tell you much, which, as Medical Directors, you will find helpful in your daily problems of selection.

Little further need be said of the remaining psychotic groups, where your medical decision is entirely dependent on the etiology involved. Obviously, the senile and arteriosclerotic groups, as well as syphilitic, drug addiction and alcoholic psychoses are uninsurable. Temporary psychotic reactions to fever, exhaustion or toxic states may be looked upon leniently if the underlying cause has been adequately eliminated and mental normality restored for a reasonable period of time. A similar attitude may be taken toward traumatic psychosis, providing no residual organic brain damage has resulted. In these cases an electroencephalogram is often helpful.

We now come to the large group, not neurotic or psychotic, (neither "fish, flesh, nor good red herring"), who, for want of a better term, are known as the psychopathic personalities. A miscellaneous conglomeration of various impairments are included in this psychiatric bouillabaisse, with alcoholics, drug addicts, sexual perverts and non-conformists of severe degree, constituting the major ingredients. Though of normal, or better intelligence than

the average, emotionally their reactions are usually between those of the child and the savage, so that they frequently run afoul of the law, are a problem in hospital care, and fill our jails. This is not the place to go into a lengthy description of this all too common personality disorder. Suffice it to say that with rare exceptions insurance should not be granted these individuals. With their notorious predisposition to psychotic reactions, poor resistance to illness, precarious legal status due to their anti-social or aggressive behavior, it would be folly to insure them. A recent mortality study of 500 alcoholics, for instance, showed that 28 per cent died directly or indirectly from the effect of alcohol through violence or illness, that the average longevity of the entire series was 52 years, and that 12 per cent died under the age of forty. *Res ipsa loquitur!*

No generalizations can be made as to the group of character and behavior disorders. These have to be assessed on their individual merits, some being innocuous from a mortality standpoint, whereas others offer a distinct longevity hazard. All one can say is that the situation has to be reviewed in its entirety and from various points of view including the duration and severity of the impairment, the nervous elasticity of the patient, his adjustment to the stresses of his vocation, his family life, and his social reactions. More will be said later about the approach to this type of problem.

Mental defectives, obviously, are not insurable.

#### *PRACTICAL POINTERS on SELECTION*

In all the above remarks, it has, of course, been taken for granted that all the facts in the case are known to the reviewing physician. This is usually true when one is in practice with the patient-physician relationship present. However, to the Medical Director, without a personal knowledge of the applicant, and having to ferret out the true state of affairs from "the papers" in the case, the problem presents itself as a "horse of a different color." How can he obtain the necessary data, what clues should be looked for, to what sources of information can he turn for additional help in order to reach an intelligent and fair decision as to insurability? I would like to list a few suggestions I have found useful in such problems:

1. Be "psychiatric minded" in all histories of vague, or frequent illnesses, especially if there was prolonged absence from work, or if a trip was required for so-called "fatigue" or "exhaustion." In all such cases, have your medical examiners obtain more information as to the actual symptoms sustained by the patient, such as the presence of mental depression, crying spells, insomnia, weight loss, possible suicidal inclination, type of therapy (especially shock treatments), hospital or sanitarium care, and how long before the patient returned to work. Obtain the name of his physician and get further information from him. You will be surprised at the frequency of severe depressions in these patients, who after recovery, so innocently minimize their past illness on insurance examination.
2. Ask for further data on mental illness in the applicant's family history. The family doctor, or inspection report, may be helpful on this point. The importance of the genetic factor in mental illness is being increasingly stressed as more accurate knowledge of psychiatry accumulates. For instance, it is known that in manic-depressive psychoses in parents, the risk of developing such an illness in their children is ten times greater than in the general population.
3. Attempt to make an estimation of the "total personality" of your applicant. Has he been stable in his job record, or does he frequently shift from one employment to another? Are there frequent absences from work? Has he adjusted well to marriage and social life? If in the armed services, was he honorably discharged without nervous illness? Or, had he been rejected by the Draft Board for such a history? If so, more data should be obtained. How has he reacted to adversity in the past, such as economic stress, death of a loved one, or war experience? What do his neighbors and fellow employees think of him? All this information gives one a better picture of "the whole man", and is conducive to more accurate judgment in the situation.
4. Place more weight on personality data in your inspection reports. All too frequently the first "storm warnings" may be picked up here, despite a negative medical examination.

Your examiners are too often not now as well acquainted with the applicant as may have been the case years ago when "family practitioners" were more frequent in most communities. Anti-selection, however, is always with us, so it is not at all surprising to find frequent comment on past health or nervous traits only in these inspection reports, or data not obtained by the medical examiner. Look with suspicion on all such information, especially as to the personality factors mentioned above, and if necessary, have the applicant seen again by your examiner so the true picture may be obtained.

5. Insist on a better psychiatric evaluation of any past history of nervous disorder by your examiners. More of them are better trained in psychiatry than was the case a generation ago. If necessary, a simple psychiatric form, with only a dozen or so questions can easily be prepared, and if the picture is unclear, have your examiner complete it in cases of this type.
6. If the applicant had been treated by a psychiatrist or has been in a sanitarium, data should be requested from the attending psychiatrist or the institution.
7. Should the question still be unresolved, it might be advisable if the pending issue is sufficiently large, to have the applicant undergo an examination by a competent psychiatrist. In such cases, all the data should be available to the psychiatrist as this is often of great help in his evaluation of the situation and his estimation of the veracity of the patient. This should not be too great a problem, as the number of qualified psychiatrists has increased enormously in the past ten years and they can readily be found in almost every town of moderate size in the nation.

It may very well be that my comments have seemed to over-stress the risk of psychiatric impairments in relation to insurability. If so, let me close on a note of greater humility as to the vast unknown territory still to be explored in this field. After all, we must not forget that exact boundaries of normalcy have never been accurately defined, that all of us have some "neurotic" component in our personalities, and that good psychiatry, which should be



good common sense, often raises more questions than it can, as yet, answer. Why is it, for instance, that genius and eccentricity are so often associated? Why in this country do we seem to over-stress conformance and minimize individuality, so frequently confuse morality with virtue, and consider anyone's behavior, differing from our own self-imposed standards, as "queer"? Is there really such an animal as a truly stable individual? The experiences of the past war have pretty well demolished this myth and shown that, given pressures great enough, any of us are vulnerable and that our "end points" are distinctly finite. So, be tolerant of personality variations and do not fall into the error of semantic confusion in calling them abnormalities. And lastly, since you are likely to be presented with histories of nervous illness more frequently for reasons outlined above, you can make a great positive contribution to our knowledge of these problems, by gathering accurate statistical data on these entities, and thereby, help dispel further a bit of the fog which in the past has too gloomily enveloped our subject matter.

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PRESIDENT BONNETT — Thank you, Dr. Denker. Are there any questions?

Our final subject for this session is coronary artery disease. Since more and more companies are issuing substandard insurance to individuals with a history of this, or to those considered to be more susceptible to such attacks than the average individual, the problem divides itself into two phases.

In our efforts to select and classify people with a known history of coronary artery disease, we should pay most attention to, and try to select from, that group in which there is some question about the accuracy of the diagnosis. The average male, age 40 and over, is very much aware of coronary artery disease and it is very likely, when he has chest pain of any sort, that he consults his doctor promptly. More doctors' offices are now equipped with electrocardiographs and the patient is most likely to insist on having an electrocardiogram. Even though the tracing may not show typical evidence of a diseased coronary artery or a myocardial infarction, there is a tendency on the part of the doctor to warn the patient about his condition, restrict his activities, advise him to stop smoking, and perhaps to reduce his weight.

This is the group, I think, we can safely select depending on the fact that the attending physician must, in his diagnosis, suspect the worst and hope for the best. In case of doubt, it is always easier to tell the patient to take care of himself in order to avoid further difficulty or an early death.

Those who have had a real attack of coronary thrombosis or myocardial infarction are most difficult to evaluate, and we can only hope that better methods for this purpose will be developed in the future.

The other side of the problem is to try to determine what group of individuals have potential disease of the coronary arteries, and try to classify them according to that potentiality.

Dr. David M. Spain, Director of Laboratories and Pathologist at Beth-El Hospital, Brooklyn, was kind enough to accept our invitation to help in the solution of this problem. He was formerly Director of the Department of Laboratories and Research of Westchester County, New York, and is widely known as an energetic and alert investigator into the problems of coronary artery disease. His paper is entitled, "The Potential Coronary." It is a pleasure, indeed, to present Dr. Spain.

## THE POTENTIAL CORONARY\*

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IRVING J. GREENBLATT, Ph. D.

This presentation is divided into essentially three parts. The first deals with anatomic alterations in the coronary arteries of young infants. The second concerns itself with observations on the degree of coronary sclerosis in apparently healthy young males, particularly as related to somatotypes. This has been the subject of a previous report. The third part is a preliminary report on the findings of an attempted correlation of somatotypes and the degree of coronary sclerosis observed at postmortem examination with the lipoprotein pattern in young adult males. This latter study is in its preliminary stages and there are too few cases to arrive at any statistically significant conclusions. However, certain interesting findings have been observed which undoubtedly will require much more intensive study. Furthermore, one of the drawbacks, as you will observe, is that there is no accurate statistical analysis of the distribution of the various somatotypes in the general population. This, of course, is an important consideration in any final evaluation of the data. There is also no adequate information as to the distribution of the somatotypes which would come through the Medical Examiner's office. Because of the various psychological patterns of behavior attributed to the various somatotypes there may very well be a difference in the numbers of each type seen in the Medical Examiner's office as compared with that in the general population. So with these obstacles in mind, we will attempt a partial presentation of what might be in the background of "the potential coronary".

We will begin a little further back than the age of forty in

\*From the Laboratories of Beth-El Hospital, the Messinger Research Laboratory of Beth-El Hospital, Brooklyn, New York, and The Medical Examiner's Office of the Department of Laboratories and Research of Westchester County, Valhalla, New York. Portions of this study were supported in part by the Westchester Heart Association.

discussing the potential coronary. In the Medical Examiner's office of Westchester County, and it is equally true throughout the country, every year there are a number of unexplained deaths of infants, usually between the ages of one and three months. The peak incidence of these deaths is usually at about two and one-half months of age. These were apparently healthy infants that were put to bed after being fed and at varying intervals ranging from one to five hours later were found dead. Usually there had been no history of any prior illness and these infants were for the most part well nourished and appeared to be entirely healthy. These deaths, as you know, in the past have been ascribed to various causes, among which are suffocation and status thymicolymphaticus. More recently, however, careful histologic evaluation of these cases reveals that there is usually some evidence of infection present in these infants but not enough to explain the rapidity of their death and lack of symptoms prior to death. At any rate, whatever the mechanism of their death might be, the cases provided a means of studying the coronary arteries of a consecutive group of apparently healthy young infants without any obvious prior illness.

The reason for this study was two-fold; one was to ascertain whether or not there was any significant difference in the thickness of the intimal cushion in male infants as compared to female infants as has previously been reported in other literature. The other purpose was to study the early anatomic changes in the coronary arteries to determine their degree, nature and distribution. We also were interested in determining whether these anatomic changes antedated the deposition of any lipid substances or whether the appearance of lipids was part of the very early process.

Fifty consecutive cases were studied. The coronary arteries were carefully dissected and sections made from both proximal and distal portions. These sections were stained with various stains and in particular with those which reveal the presence of lipid whether in occult or other forms. In Figure 1 it is possible to observe a section from a proximal segment of a normal coronary artery (left anterior descending branch). This shows an intact elastic membrane and there is practically no intimal cushion present. Figure 2 shows a coronary artery from the same site in

another infant with a thin uniform intimal cushion and intact elastic membrane. In Figure 3 one may observe an alteration in the coronary artery. There is a disruption of the elastic tissue with fragmentation and an increase in the ground substance. Some fibroblastic proliferation is present. Figure 4 demonstrates in another infant a further stage of the same process. In this instance, there is complete disruption in the elastic membrane and the intimal cushion, which is quite thick, contains a marked increase in ground substance and considerable fibroblastic proliferation. Figure 5 shows an even further stage of the same process in another infant. Figure 6 reveals a typical example of what is usually seen in sections from the distal portions of the main coronary artery. These sections were taken at sites which later in life usually do not contain any advanced degree of coronary atherosclerosis. Sections taken from these areas in all of the infants studied did not reveal any of the changes seen in the proximal coronary areas. The anatomical alterations were present in about one-half of the infants studied and it has been demonstrated were present primarily in those sites which later on in life develop the most extensive atherosclerosis.

Measurements of the intimal thickening or cushions in males as compared to females failed to reveal any significant differences between male and female. So, at least in this study, we were unable to confirm the previously reported finding that the intimal cushion is usually twice as thick in the male infant as in the female infant. We were, therefore, unable to state that the male begins life with a coronary artery more predisposed towards atherosclerosis than does the female.

In none of the cases that revealed anatomical alterations were we able to demonstrate, with the several stains used, any lipid deposits. This is in agreement with reports of others who have performed similar studies. This early change in the coronary artery, whether one regards it as physiologic or pathologic (and this would be purely a question of semantics), antedates the appearance of lipid. Lipid deposits usually appear several months later, or by the first or second year of life.

Now, let us leave the infant group and proceed to the adult males. The infants were presented in order to demonstrate that

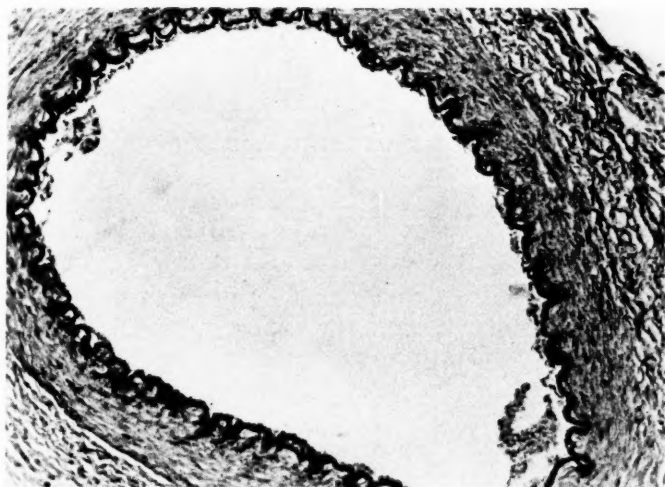


Figure 1

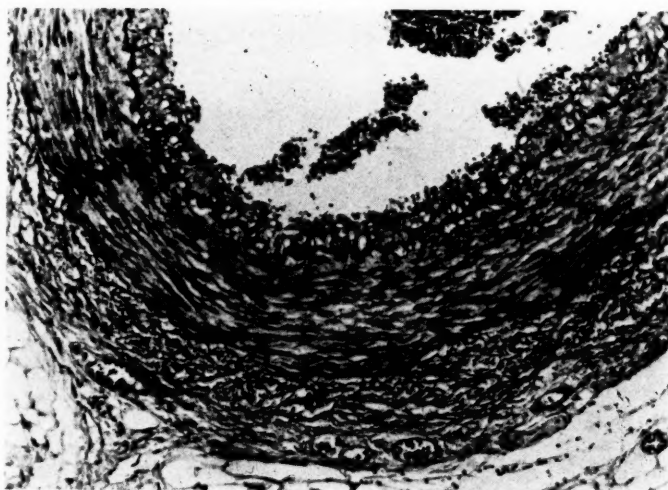


Figure 2

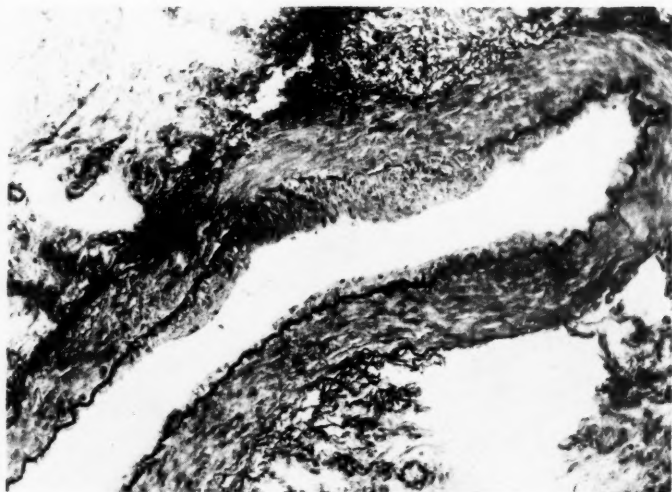


Figure 3

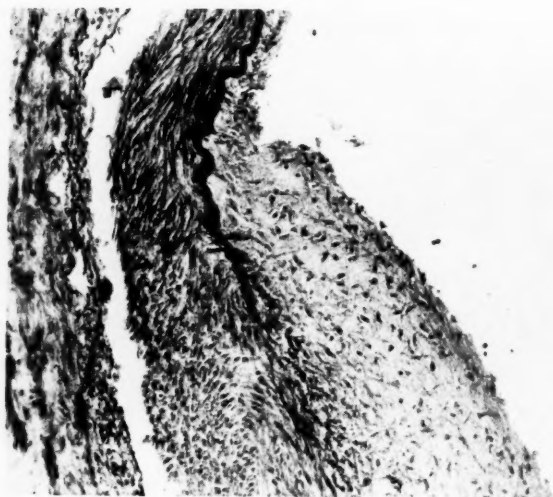


Figure 4



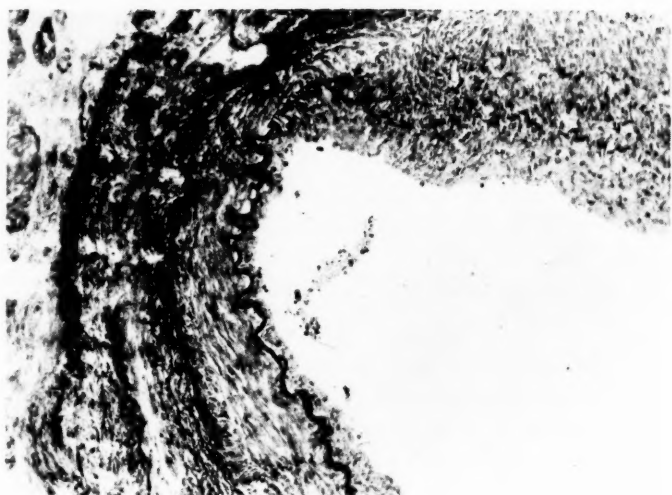


Figure 5

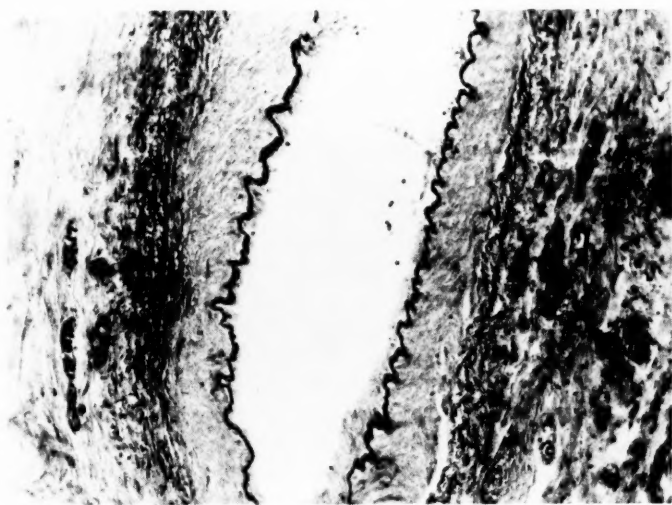


Figure 6

"the potential coronary" probably begins in infancy. It does not mean, however, that each one of these infants is going to develop clinical atherosclerosis. But, it is demonstrated that the anatomic substrata in the coronary blood vessels begins very early in life.

The next study was one performed on cases which came to the attention of the Medical Examiner. We selected adult, white males under the age of 46 who had died suddenly, either as a result of suicide, accident, homicide or of previously unsuspected coronary artery disease. These were consecutive cases and with only a few exceptions the individuals had been considered to be healthy and going about their usual activities just prior to the time of death. Of course, in some among the cases of suicide there was a prior history of psychiatric care. We believe that as a whole the cases investigated represented a fairly accurate cross-section of the population in the community where the study was made. We attempted to control the figures with the census analysis of the population of Westchester County, New York. Fortunately, most of those included had resided in the county for a long time. The general occupation, economic and social groupings corresponded with those of the general population. They were then classified according to somatotype. It was obviously impossible to go into all the finer details of the somatotypes on a cadaver, but it was possible by using many of the criteria listed by Sheldon to determine the dominant somatotype of each case. Three independent observers, prior to the autopsy, recorded their somatotype determination and generally there was remarkably close agreement. Cases were divided into four groups; the mesomorphs, the ectomorphs, the endomorphs and the mixed type. The mesomorph is the well-muscled, athletic type; the ectomorph the thin, elongated type; and the endomorph the rounded type. The cases were then, after autopsy, separated into two groups; those in which death had occurred suddenly of coronary occlusion and those in which death had resulted from non-natural causes. In the Medical Examiner's office the cases of coronary occlusion differ somewhat from those seen by the physician in practice. Those in the Medical Examiner's office are individuals who, because they had few or no symptoms relating to their heart, had not been seen by a physician and had been going about their usual activities when death occurred sud-

denly from an acute attack of coronary insufficiency. They died within a few minutes to an hour from the onset of the attack. In such cases, at autopsy, one rarely finds thrombi in the coronary arteries or myocardial infarcts. One usually finds advanced degrees of coronary atherosclerosis with varying degrees of occlusion. There were 38 instances of sudden death from coronary artery disease in this young adult male group. Of these, 24 were mesomorphs, three were ectomorphs, three were endomorphs, and eight were of the mixed type. Even in this small group, it is possible to see that there is a marked predominance of the mesomorphs and it would seem to indicate that of those who die of coronary artery disease under the age of 46, the mesomorph predominates (see Table 1). In Table 2, the age distribution in these

TABLE 1

## Body Type and Coronary Deaths

Body Type	Number of Cases
Mesomorph	25
Ectomorph	3
Endomorph	3
Mixed	8
TOTAL	39

TABLE 2

## Age Distribution of Deaths from Coronary Artery Disease

Age	21-25	26-30	31-35	36-40	41-45
No. Cases	0	3	9	14	12

deaths from coronary artery disease is demonstrated. There were none under the age of 25 in this particular group. (Many illustrations were shown of representative examples of coronary arteries in the various somatotypes dead of coronary artery disease. These emphasized the statements made above.) It is important to note that many of these cases had no symptoms except just prior to

death. This is important from the viewpoint of attempts to correlate cholesterol and lipoprotein patterns with the clinical degree of coronary atherosclerosis. Some of these cases may well have been used prior to their death as normal controls. Of course, as you know, even with the use of the electrocardiogram, ballistocardiogram and exercise tolerance tests some may not have revealed any abnormalities.

The other group of young adult males who died from accidental and other causes numbered 73 consecutive cases. The comparison of the degree of coronary sclerosis in these cases with the body type is illustrated in Table 3. These figures may be a little more significant and for purposes of discussion will be limited to the mesomorphs and ectomorphs in this group. There were 30 mesomorphs and 24 ectomorphs with average ages respectively of 36 and 35 years. Therefore, age was not a factor in any of the differences observed between these two groups. The amount of coronary sclerosis as plotted and classified at autopsy is listed in Table 3. Each heart had been injected with radio-opaque material and was then cut open according to the technique of Schlesinger. X-ray pictures were then taken and the vessels were thoroughly dissected and on a previously prepared chart the degree of coronary sclerosis was recorded. One must realize that recording of the degree of coronary sclerosis is arbitrary but was comparable with-

TABLE 3  
Comparison of Physique with Degree  
of  
Coronary Sclerosis in Non-Cardiac Deaths

Body Type	No. Cases	Average Age	Degree of Coronary Sclerosis				
			0	1+	2+	3+	4+
Mesomorph	30	36	3	7	10	6	4
Ectomorph	24	35	14	6	4	0	0
Endomorph	7	29	4	3	0	0	0
Mixed	12	33	5	4	1	2	0
TOTAL	73	35	26	20	15	8	4

in our own standards. Attention was paid to both the narrowing of lumen and the diffusiveness of involvement. In Table 3 it is noted that the involvement was much greater in the mesomorphic group. Mesomorphs showed a predominance for the development of atherosclerosis of the coronary artery to a greater degree and much earlier in life than the ectomorphs. (Illustrations of representative coronary arteries in the various somatotypes served to emphasize the findings in Table 3.)

In Table 4, there is a comparison of the age, heart weight and body weight in all cases. It should be mentioned that all cases in

TABLE 4

Comparison of Age, Heart Weight, and Body Weight in all Cases

Type	No. Cases	Average Age (yrs.)	Heart Average Weight (gms.)	Body Average Weight (lbs.)
Coronary deaths	38 (36)*	38	415 (385)*	168
<b>Non-coronary deaths</b>				
Mesomorph	30	36	350	163
Ectomorph	24	35	360	152
Endomorph	7	30	370	190
Mixed	12	33	400	169
All types with no sclerosis	28	29	370	165

\*Number of cases and average weight of hearts after two cases with known hypertension were excluded.

which there was a known history of diabetes or hypertension were eliminated from the study. However, we had two cases in which there were arterial hypertension that crept into the study. If these cases are subtracted and the figures then corrected, it is found that there is no difference in the heart weight between the coronary deaths and the non-coronary deaths and between those cases with advanced coronary sclerosis and those with no significant sclerosis. There was no significant difference in body weight in the groups studied.

In Table 5, the degrees of sclerosis at the various age levels in all of the known cardiac deaths may be observed. It may be noted that above the age of 31 there is a considerable anatomic degree of atherosclerosis in over 50 per cent of the individuals. This has an important bearing on the interpretation of statistics and clinical studies in which certain individuals are considered to be normal controls for blood lipoprotein and cholesterol determinations.

TABLE 5

Degree of Sclerosis at Various Age Levels  
In All Non-Cardiac Deaths Under the Age of 46

Degree of Sclerosis	Age				
	21-25	26-30	31-35	36-40	41-45
0	10	6	5	3	4
1 plus	1	4	3	5	6
2 plus	0	5	2	4	5
3 plus	0	1	1	2	3
4 plus	0	0	0	0	3
TOTAL	11	16	11	14	21

The final aspect of this discussion concerns itself with a repetition of the above study but this time lipoprotein studies were made on the postmortem blood of each case. Prior to this it was necessary to determine whether postmortem lipoprotein determinations were a valid representation of the pattern present during life. So, we managed, in one way or another, to determine the lipoprotein patterns on some individuals prior to death and then obtained the blood of these same individuals following death and performed lipoprotein determinations. This was done on nine cases. At the same time samples of postmortem blood were collected from some at varying intervals following death. The lipoprotein pattern during life and that of the postmortem blood were within the range of experimental error. This was also true of samples taken six and sixteen hours postmortem on the same individual.

So far, we have had the opportunity of studying 60 cases. These cases of sudden death were examined very carefully and the degree of atherosclerosis plotted, the bodies were classified as to somatotype and the lipoproteins in the postmortem blood determined.

Now, as stated previously, these are entirely preliminary findings. There are certain interesting correlations present and certain discrepancies which may be even more important. All of these require further investigation, but we think for the first time this represents an attempt to approach this problem on a real anatomic basis and thus try to correlate the actual anatomic findings in the coronary arteries with the lipoprotein pattern of the blood. However, it must be remembered that we obtained only one lipoprotein determination in these cases, so that if this indicates anything it merely indicates what was present only at that particular time. It may have been something else a year before. In those instances where there is a correlation, the findings may merely be associated phenomena. We have no right on the basis of these findings to talk about cause and effect. However, these associated findings may be very helpful in the early diagnosis in some of these cases. Without going into detail, we can state that in only one instance was there a false positive; that is, in only one case was the lipoprotein pattern for that particular age group interpreted as being abnormally high and yet no coronary atherosclerosis was found. The discrepancies that were found were in the other direction where there were normal lipoprotein patterns for the age and yet significant degrees of coronary atherosclerosis were present. The closest correlation was found in the mesomorphic group. In all there were 17 cases of advanced coronary atherosclerosis in which the lipoprotein patterns were interpreted as abnormal. In three of the ectomorphs that died from coronary artery disease and who at postmortem examination had four plus atherosclerosis of the coronary arteries (all adult white males under age 45), the lipoprotein patterns were interpreted as being within normal range. Another finding, confirming previous knowledge, was that concerning the lipoprotein patterns found in four cases of recent myocardial infarction. Despite evidence of advanced coronary atherosclerosis in all four of these cases the lipoprotein patterns were normal. It has been known for some time that if an individual

has an abnormally high lipoprotein pattern this may revert to normal during a period of acute myocardial infarction.

One such case was of particular interest. It was a 35 year old female, the mother of two children, who had been standing at the railroad station in the morning awaiting a train. On careful retrospective check, there was no history of any prior illness. She had been considered a healthy individual, she had a brief attack of precordial pain and dropped dead at the station within a half hour of the onset of this attack. At postmortem examination, she had advanced atherosclerosis involving mainly a small segment of the left anterior descending branch of the coronary artery tree. This completely occluded the lumen. The remainder of the coronary artery tree was relatively normal. In this particular case the lipoproteins ( $S_f$  12-20 and  $S_f$  20-100) were abnormally high. Despite the fact that from a qualitative point of view there was little atherosclerosis, it was strategically placed. On the other hand, we have observed the opposite in several individuals with localized atherosclerosis strategically placed at one point and who had normal lipoprotein patterns. This situation represents one of the difficult problems in correlation (clinical and anatomic) that one encounters. In the last six months we have observed three cases of another type which also bears on the same problem. One case was that of an 18 year old boy in football training who died while running around the track on a very hot day. Another was that of an individual who swam across a pool and then dropped dead; and still another was an individual who suddenly dropped dead while at work. All three of these cases had abnormally small right coronary arteries with some atherosclerosis of the left coronary artery. Although insignificant amounts of atherosclerosis were present, all died from relative coronary insufficiency because of the abnormal anatomic pattern of their coronary artery tree. This presents another hazard in the attempt to correlate the lipoprotein pattern with the clinical picture of coronary artery disease. The final illustration is that of a 78 year old man who died in an automobile accident. His coronary arteries were almost like those of a new-born babe. His lipoprotein pattern was normal.

We must repeat that these are purely preliminary findings but they attempt to indicate that at any age a mesomorph with an ab-



normally high lipoprotein pattern should be regarded as a "potential coronary", even in the absence of any clinical symptoms or signs whatsoever. The other groups do not reflect the correlation as well. Discrepancies found in the ectomorph are of extreme interest and require further study.

PRESIDENT BONNETT — Thank you, Dr. Spain.

Are there any questions or any further data you would like to have Dr. Spain give us? It sounds like a fascinating study, and I hope we can hear more about it when your investigations are completed.

MR. HERBERT H. MARX — There is one question that I would like to ask Dr. Spain, and that is, in the infants was there any sex difference in proportion to the coronary disease?

DR. SPAIN — No, there was not. That is why the question of what bearing this has on atherosclerosis is difficult to answer.

DR. GUBNER — I would like to point out that the potential coronary is not only a constitutional and pathologic entity, which Dr. Spain has made so beautifully clear, but it is also, in large measure a clinical entity as well. This is very important for us in insurance medicine.

There is a very large number of persons who develop acute myocardial infarction, and who will give a definite history of precordial pain of an indefinable character, not typically anginal. Such cases go on to develop a true myocardial infarct and then there is no problem for us. But there are many others, in addition, who do not develop the full-blown pattern of myocardial infarction. I have had personal experience with many — by coincidence, and with three within the past few weeks — where only trivial changes are to be seen in the electrocardiographic findings in individual leads, other relatively insignificant changes, or changes which quickly reverted to normal. On this point I feel it most important that we exercise more caution when precordial pain is given in the history, despite negative findings.

I had four instances where a suggestive history of myocardial disease did not appear, where exercise and cardiac insufficiency (electrocardiographic) tests were entirely negative, and they developed infarcts within a few days.

Therefore, I feel that negative examinations with a history of pain by no means preclude coronary disease, and we should regard these cases as "potential coronaries". In insurance medicine, despite the negative examination, with a history of precordial pain, I think a period of two years should elapse before we can accept those as risks in any way at all, except as poor risks.

I think that Dr. Spain's most important contribution is that probably we ought to pay more attention to body build in these individuals. I would like to hear his comments on the clinical type of potential coronary as well.

DR. SPAIN — I am going to play safe. I am a pathologist and will not comment on the clinical potential.

I want to re-emphasize that the case we have in the Medical Examiner's office and the case of the subject for this study are entirely different types from those seen by clinicians. They are not the ones that have, as a rule, infarction or thrombosis. They have died suddenly and usually with the first clear cut episode. Many of them may have had attacks, as you say, but they have never paid attention to them or gone to a physician, nor has it ever been brought out that they have had precordial pain.

PRESIDENT BONNETT — In a way we have the cart before the horse by arranging the next paper to succeed rather than precede that by Dr. Spain. However, I doubt if many of the criteria mentioned by Dr. Spain were available in the data from which the paper was prepared.

I am sure you will remember the authors. Mr. Herbert H. Marks, Manager of Insurance Medical Statistics, Metropolitan Life Insurance Company, has in the past been co-author of many excellent papers for this Association. Dr. George P. Robb, Assistant Medical Director, Metropolitan Life Insurance Company, has long been interested in cardiology. You will recall that in 1937 he developed and introduced the method of cardiac study now known as angiocardiology, a procedure widely used in the diagnosis of acquired and congenital abnormalities. It is a pleasure to introduce Mr. Marks, who will present, "What Happens to Men Disabled by Heart Disease."

## WHAT HAPPENS TO MEN DISABLED BY HEART DISEASE

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and

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### *Introduction*

Heart diseases have for many years ranked first among the causes of death in the population of this country and their dominant position has become increasingly marked with the passage of time. This is primarily a reflection of the steady growth in the proportion of older persons in the population. Heart diseases are also a major and increasingly important cause of disability. A recent intercompany study of total and permanent disability contracts by a Committee of the Society of Actuaries<sup>1</sup> showed that payments because of all types of cardiovascular disorders have accounted for a steadily increasing proportion of the total, regardless of the type of contract. At ages 50 to 59 they have accounted for more than half the amounts paid out in recent years, and the crude rate of disablement under all but one type of benefit exceeded 5 per 1,000 per annum. The great majority of these disabilities were from heart diseases. In our own Company, too, the long term trend of the admission rate for disability from cardiovascular diseases has been upward. The rate was less than 1 per 1,000 per annum prior to 1932 on contracts issued prior to 1930, and is now over 3 per 1,000. In the meantime, the proportion of cardiovascular disability of all types to the total has increased to nearly one half, and again the great majority of these disabilities are accounted for by heart diseases. These increases are due primarily to the rise of the average age of the group having this disability coverage. While we have no systematic data on the rate and proportion of recoveries from disability in heart diseases, they are probably less than the average for non-cardiac causes.

An important gap in our knowledge of diseases of the heart relates to their prognosis. This is not surprising because few practicing physicians or even clinical groups are able to accumulate a sufficiently large experience on patients with a specific disease, nor do they often possess the resources or equipment necessary to make studies of the kind reported here. In contrast, the life insurance companies have abundant data for such studies, the resources to follow up cases over long periods and to evaluate the end results, as well as a practical interest in the matter.

Of prime value as source material for the study of prognosis in heart diseases are the records of persons receiving benefits under disability contracts issued in connection with their life insurance. There is a growing appreciation of the value of this source in studies of prognosis in recent years. At recent meetings of this Association two papers were presented based on such records, the first by Pearce Shepherd<sup>2</sup> of the Prudential on pulmonary tuberculosis; and the second, on myocardial infarction, by Drs. Waldron and Constable<sup>3</sup> of the Mutual. The Metropolitan became interested in the possibilities of such material several years ago, and in 1946 first reported its experience on cases disabled by heart disease<sup>4</sup>.

#### *Data of the present study*

The present study considers two broad aspects of the problem; first, the prognosis from the time of admission to disability, and second, the prognosis from the time of recovery from disability. The cases have been drawn from the same source, but represent two separate cohorts which, however, overlap slightly. For the first phase of the study we have used those cases reported or admitted to disability in 1934-1936. They were traced to the 1952 anniversary of admission. The analyses consist of the survivorship record of these cases, the mortality by cause, and rate of recovery. The second cohort consists of cases on issues of 1925 to 1949 whose disability benefits were terminated by recovery between 1925 and 1949. These were traced to their anniversary of recovery in 1952. For this group we have the facts on survivorship and the mortality by cause.

While the main emphasis in our analysis is on the record of survivorship, we have also compared the mortality of the several groups with that expected on the basis of the experience among

standard insured risks. For this purpose we have used an inter-company experience at the longer durations of insurance during the period 1939-1950. The ratios obtained in this way represent fair approximations rather than exact measures.

*Nature and characteristics of the material*

Both phases of our study are based upon white males who were granted disability benefits under contracts issued in connection with Ordinary life insurance policies. In the Metropolitan, during the period covered by this study, such contracts providing both Waiver and Annuity were issued until 1931. Although the maximum amount of annuity benefits was \$500 per month, the average benefit per individual was only about \$50 per month. Only the combined Waiver and Annuity was available except for amounts of insurance exceeding \$50,000 face value. Subsequent to 1931, only waiver of premium contracts were issued. Admission to benefit under all contracts issued from the beginning and up to 1930, regardless of the actual date of disability, required medical evidence that the disability was both total and permanent. The various contracts issued up to then differed for the most part only with respect to the waiting period. Under the contracts issued in 1930 and 1931, the claimant was required only to show evidence that he had been completely disabled for the prescribed waiting period, and this was taken as presumptive evidence of permanent disability. However, under all types of contracts, satisfactory evidence of continued disability was required at intervals and the benefits were terminated if the insured had resumed some type of work or was found able to do so. A majority of the cases on Waiver and Annuity were insured under disability contracts with the total and permanent provision, while those on Waiver only generally were insured under the contracts with the presumptive provision. Obviously, cases which terminated fatally soon after a heart attack would not be represented in this experience, and by definition as given above, the material in the later period would include a small but undeterminable number of cases that were not permanently disabled.

An important element in the situation with regard to disability annuity benefits is the temptation they provide to eligible persons to attempt to qualify for them in periods of economic stress, and

once qualified, to continue on them. In some cases this may be a matter of pure malingering, but in many cases the insured refrains from resuming work because of his fear that his condition will get worse, or because of his belief that it may be difficult to be restored to benefits if he again has to give up work. This is particularly the case when the amount of benefits is substantial. These considerations, however, are of relatively little importance in the Metropolitan's experience, primarily because of the small average size of the policies issued during the period covered by the study. As a result of limiting this study to persons who originally qualified for Standard insurance the group includes largely men in the middle economic brackets. For the most part, they engaged in trade and commerce, in clerical occupations, in professional pursuits, and in industry as proprietors, managers, and skilled workers.

The term recovery as used here means simply either actual resumption of work of some kind or the ability to do so, based upon medical opinion. The condition of the individuals at recovery represents a wide range of continued impairment. The great bulk of cases, it is believed, were in relatively good health and well able to resume normal or nearly normal activity. Others, pressed by need or by the desire to get back into remunerative work or employment did so, even though from the medical viewpoint they were not fully ready.

The classifications of the cases with cardiovascular disease in both phases of the study were based on careful review of the available medical reports on disability claims. In general, those reports were fairly adequate; in some instances greatly detailed, with electrocardiographic and X-ray examinations. Some individuals were examined by several physicians and not infrequently by qualified cardiologists. We have discarded cases in which the clinical evidence available did not substantiate the diagnosis for which the individual was admitted to benefit. In the study of recovered cases we have used all the information received up to the time of recovery. In general, this information was most adequate on cases under contracts requiring that disability be both total and permanent.

Since the period covered in our study is rather long, particularly in the second phase, our clinical information is affected by changes

both in the methods of diagnosis and in the clinical viewpoints that developed over the years with regard to organic heart conditions. In the 1920's the terms "coronary heart disease" and "coronary thrombosis" were just beginning to be used. Comparatively little was then being done in life insurance medical practice with electrocardiography or X-ray study of heart size, and normal standards for the interpretation of the findings were only in process of development. It is only in comparatively recent years, and only where circumstances warranted, that extensive use has been made of these more exact diagnostic procedures in cardiac examinations for life insurance. In the circumstances, diagnoses of coronary heart disease and even of coronary occlusion were made in earlier years which, in some cases, would not stand up today. Even if we could exercise hindsight to the fullest — a dangerous proceeding at best — the facts upon which a more precise diagnosis could be made are frequently lacking. We know, too, that the insured's physician particularly, was inclined to interpret his findings in favor of the patient. In most instances, however, we had objective evidence based upon independent medical investigation, and this helped to guide us in the handling and evaluation of the facts.

We frankly admit that, despite our neat classifications, the material is not absolutely homogeneous. However, the fact of serious and often prolonged disability, together with the clinical information available, shows that we are dealing with a seriously impaired group.

#### *FOLLOW-UP OF CASES FROM DATE OF ADMISSION TO DISABILITY*

The first phase of our study covers 540 men reported and/or admitted to disability between 1934 and 1936, whom we have traced to the anniversary of admission in 1952. All these cases were on Waiver and Annuity and the great bulk of them had to qualify under the total and permanent disability provision.

In classifying the cases according to type of heart disease we segregated two broad groups, valvular heart disease, and hypertensive or arteriosclerotic heart disease.\* The latter group was subdivided into three classes, — men who had a history of an acute

\*Acknowledgment is made to Dr. K. J. Thomson, Assistant Medical Director of the Metropolitan, for his assistance in reviewing and classifying the cases.

coronary episode, those who had cerebral or renal involvement, and those with no record of either of these complications. This last group, for the sake of brevity, we shall refer to as the uncomplicated arteriosclerotic-hypertensive or simply the uncomplicated group. No attempt otherwise was made to distinguish those with arteriosclerotic heart disease from those with hypertensive heart disease.

Table 1 shows the composition of the group admitted to disability according to type of heart disease and age. The cases with valvular heart disease, chiefly rheumatic in etiology, accounted for but a small proportion of the total, and the median age at admission in this group was 47.3 years. In the arteriosclerotic-hypertensive group, over one third had had an acute coronary episode, about a sixth had had renal or cerebral involvement, and about one half were uncomplicated cases. The age distribution in these three sub-categories was rather similar, the median age in all cases being between 51 and 53 years.

Table 1

Men Disabled by Heart Disease  
Classified by Age at Admission and by Type of Heart Disease  
Metropolitan Life Insurance Company, Ordinary Department,  
Cases Reported and/or Admitted to Disability in 1934-1936.

Age Groups	Valvular Heart Disease	Arteriosclerotic and Hypertensive Heart Disease			
		Total	Coronary Occlusion	Other, Uncomplicated	Other, with renal or cerebral involvement
Total	70	470	166	223	81
Under 40	15	18	7	8	3
40-49	31	163	59	73	31
50-64	24	289	100	142	47
Median Age (years)	47.3	52.0	51.5	52.9	51.3

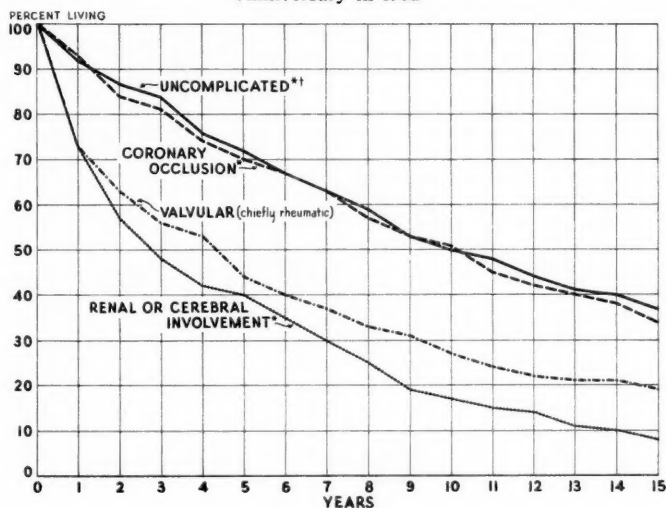
Chart 1 shows the overall picture of survivorship in each of these groups during the first 15 years of the experience. It is seen that the survivorship rate in the arteriosclerotic-hypertensive group



was much alike for those who had suffered an acute coronary episode and for those who had no complications. The cases with cerebral or renal involvement had the poorest record of survivorship. For those with valvular heart disease, chiefly men with decompensated rheumatic heart disease, the results were also relatively poor.

Chart 1

Survivorship of White Men Disabled by Heart Disease  
Metropolitan Life Insurance Company, Ordinary Department, Disability  
Cases Reported and/or Admitted in 1934-1936 and Traced to  
Anniversary in 1952



\*Arteriosclerotic and Hypertensive.

†Excluding those with coronary occlusion and with renal or cerebral involvement.

Table 2 gives the actual survivorship rates at each anniversary up through the 18th year, or up to the point where the number of lives exposed dropped to five or less. In the case of valvular heart disease, nearly three fourths survived the first year; less than half the fifth year; about one fourth the tenth year; and nearly one fifth the fifteenth year.

For the arteriosclerotic-hypertensive group in the aggregate, the experience was much better. This applies particularly to the cases reporting a coronary episode and the uncomplicated group for which the results are similar. In both groups, 7 out of 10 survived 5 years; half, 10 years; and more than a third, 15 years. In the presence of renal or cerebral involvement the results were much less favorable, with only 4 out of 10 surviving as long as 5 years, and only 1 out of 6 as long as 10 years.

Table 2

Survivorship Rates (Per Cent) of Men Disabled by Heart Disease at Successive Anniversaries of Admission to Disability. By Type of Heart Disease.

Metropolitan Life Insurance Company, Ordinary Department, Cases Reported and/or Admitted to Disability in 1934-1936, Traced to Anniversary in 1952

Anniversary	Valvular Heart Disease	Arteriosclerotic and Hypertensive Heart Disease			
		Total	Coronary Occlusion	Other, Uncomplicated	Other, renal or cerebral involvement
1	73%	89%	93%	92%	73%
2	63	80	84	87	57
3	56	77	81	84	48
4	53	69	74	76	42
5	44	66	70	72	40
6	40	61	67	67	35
7	37	57	63	63	30
8	33	52	57	59	25
9	31	47	53	53	19
10	27	44	51	50	17
11	24	41	45	48	15
12	22	38	42	44	14
13	21	35	40	41	11
14	21	34	38	40	10
15	19	31	34	37	8
16	17	30	32	37	*
17	15	29	32	35	*
18	*	27	30	33	*
Number of Deaths to 18th Anniversary		325	110	139	76

\*5 lives or less exposed.

Table 3 shows for the main categories the survival rates in age groups 40 to 49 and 50 to 64 at the time of admission to disability.

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Table 3

Survivorship Rates (Per Cent) of Men Disabled by Heart Disease at Successive Anniversaries of Admission to Disability. By Age Groups at Admission and by Type of Heart Disease

Metropolitan Life Insurance Company, Ordinary Department,  
Cases Reported and/or Admitted to Disability in 1934-1936,  
Traced to Anniversary in 1952

Anniversary	Valvular Heart Disease		Arteriosclerotic and Hypertensive Heart Disease					
			Coronary Occlusion		Other, uncomplicated		Other, renal or cerebral involvement	
	Ages 40-49	Ages 50-64	Ages 40-49	Ages 50-64	Ages 40-49	Ages 50-64	Ages 40-49	Ages 50-64
1	68%	88%	95%	91%	86%	94%	71%	77%
2	48	83	90	80	84	88	48	64
3	35	79	90	76	82	84	39	55
4	35	79	80	72	78	76	35	47
5	32	62	75	69	75	71	35	43
6	32	54	73	65	69	66	32	36
7	29	50	64	63	66	61	32	28
8	29	37	59	57	64	58	26	23
9	29	37	57	51	58	51	19	19
10	29	23	57	47	55	49	19	17
11	26	*	50	42	50	48	16	15
12	26	*	46	39	49	42	*	13
13	23	*	43	38	43	41	*	9
14	23	*	38	38	41	40	*	*
15	23	*	34	33	40	35	*	*
16	23	*	34	31	40	35	*	*
17	23	*	34	31	40	32	*	*
18	*	*	*	31	40	30	*	*
Number of Deaths to 18th Anniversary	25	20	38	67	42	92	28	45

\*5 lives or less exposed.

The experience is not shown where the number exposed dropped to five or less. The number of cases at ages under 40 were too few to yield reliable results. In the case of valvular heart disease the survivorship record during the first seven years was much poorer for those 40 to 49 than for those 50 to 64, but from then on the results were more nearly alike. The survivorship rates for men who experienced an acute coronary episode were consistently

better at ages 40 to 49 at admission than for the older cases up through the 13th year. Subsequently, the rates were similar. In the uncomplicated arteriosclerotic-hypertensive group, the record was slightly better for the older men during the first three years of disability, but thereafter the reverse was true. However, the margin was relatively small over most of the period, considering the difference in age. Cases with renal or cerebral involvement showed appreciably poorer results at the younger ages than at the older ages up through the fifth year, but subsequently the differences between the two age groups were small.

Comparisons between the several categories in the two age groups separately show that the acute coronary group fared somewhat better than the uncomplicated arteriosclerotic group during the early years after disability among those 40 to 49, but by the 5th year the rates for the two groups are similar and remain so up to the 14th year. After that the acute coronary group had a poorer record. The survivorship rates in both these categories at ages 40 to 49 were higher than for cases with renal or cerebral involvement, and for those with valvular heart disease. The record for the latter two was similar up through the 8th year, but in the small experience beyond that point, valvular heart cases showed the better result.

At ages 50 to 64 the survivorship rate in the uncomplicated group was appreciably higher than in all the others during the first three years, but after that the rate in the acute coronary group was generally about as high. The experience on valvular heart cases in this age group was about the same as in the acute coronary cases in the first three years, but after the 4th year was distinctly the poorer. The record for cases with arteriosclerotic-hypertensive heart disease complicated by renal or cerebral conditions was consistently inferior to that for the other three categories.

#### *Comparison of Actual and Expected Mortality*

Table 4 gives the ratios of actual to expected mortality up through the 15th year after admission according to age and duration since admission, and type of heart disease. Without exception, the observed deaths were well in excess of the expected. Considering first the results by type, the lowest ratio — about  $3\frac{3}{4}$  the

## MEN DISABLED BY HEART DISEASE

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Table 4  
 Ratios of Actual to Expected\* Deaths Among Men Disabled by Heart Disease  
 By Age Groups at Admission and Duration and by Type of Heart Disease  
 Metropolitan Life Insurance Company, Ordinary Department, Cases Reported and/or  
 Admitted to Disability in 1934-1936, Traced to Anniversary in 1952

Duration from Admission (Years)	All Ages, 20 to 64				Ages 40 to 49				Ages 50 to 64			
	Years of Life Exposed	Actual Deaths	Per Cent Actual of Expected Deaths	Years of Life Exposed	Actual Deaths	Per Cent Actual of Expected Deaths	Years of Life Exposed	Actual Deaths	Per Cent Actual of Expected Deaths	Years of Life Exposed	Actual Deaths	Per Cent Actual of Expected Deaths
Valvular Heart Disease												
1-15	445	56	970	173	24	1,540	185	18	460			
1-5	241	39	1,630	89	21	3,780	103	9	520			
6-10	129	12	640	47	1	210	57	9	670			
11-15	75	5	330	37	2	360	25	—	—			
Coronary Occlusion												
1-15	1,546	107	410	585	38	700	901	65	320			
1-5	713	49	560	268	15	870	416	31	450			
6-10	498	32	360	186	10	570	296	21	300			
11-15	335	26	300	131	13	660	189	13	200			
Arteriosclerotic and Hypertensive, Uncomplicated												
1-15	2,073	135	370	696	42	650	1,348	88	280			
1-5	967	62	500	311	18	900	622	41	400			
6-10	655	46	390	229	14	650	441	30	310			
11-15	451	27	220	156	10	430	285	17	170			
Arteriosclerotic and Hypertensive with Renal or Cerebral Involvement												
1-15	429	74	1,140	162	27	1,950	256	44	860			
1-5	259	49	1,520	91	20	3,520	161	27	1,020			
6-10	119	18	870	45	5	1,190	70	12	740			
11-15	51	7	570	26	2	510	25	5	600			

\*Based on Intercompany Experience on Standard Insurance at durations 16 years and over in 1939-1950.

expected, was found in the uncomplicated arteriosclerotic-hypertensive group; next lowest was for those with coronary occlusion — 4 times the expected. In the other two groups the mortality ratios are much higher — nearly 10 times the expected in those with valvular heart disease, and more than 11 times the expected in those disabled by arteriosclerotic-hypertensive heart disease with cerebral or renal complications. In all groups, the ratios declined with increase in lapse of time, and generally also with age. For example, among men disabled by coronary occlusion, the observed deaths were about  $5\frac{2}{3}$  the expected in the first 5 years,  $3\frac{2}{3}$  the expected in the 6th to 10th years, and 3 times the expected in the 11th to 15th years. As for the results by age, the ratio for those 40 to 49 when disabled was about 7 times the expected through the 15th year, as compared with approximately 3 times the expected for those disabled at ages 50 to 64.

#### *Rate of Recovery from Disability*

This part of our analysis relates to recoveries within 10 years of admission, taking separately the first two years, the 3rd to 5th years, and the 6th to 10th years. Table 5 gives the results for groups with at least 5 recovered cases. In the overall picture the record in this respect was best for those who had an acute coronary episode. Over the 10 years following admission to disability, 35 of this group of 166 cases recovered, corresponding to a rate of 3.4 per cent per annum. In the uncomplicated arteriosclerotic-hypertensive group, 35 out of the 223 cases recovered, corresponding to a rate of 2.4 per cent per annum. Among those with valvular heart disease whose average age is lower than in the other categories, only 9 of the 70 cases recovered, equivalent to a rate of 2.7 per cent per annum. There were only 3 recoveries in the 81 arteriosclerotic-hypertensive cases with renal or cerebral involvement.

The recovery rates declined as the duration since admission to disability and the age at admission increased. For example, among those with an acute coronary occlusion the rate was 5.1 per cent per annum in the first 2 years after admission to disability; 3.3 per cent in the next 3 years, and 2.1 per cent in the 6th to 10th years. For men 40 to 49 on admission to disability for a coronary episode, the rate of recovery in the entire 10 year period was 4.3 per cent, compared with 2.7 per cent at 50 to 64. These findings

are not surprising since with increasing age and duration of disability the individuals are approaching or are already past the age of normal retirement, and less of them are willing to give up a benefit, even though small, that will carry on for an indefinite period.

Table 5

Annual Recovery Rate (Per Cent) Among Men Disabled by Heart Disease. By Age Groups at Admission and Duration and by Type of Heart Disease

Metropolitan Life Insurance Company, Ordinary Department,  
Cases Reported and/or Admitted to Disability in 1934-1936,  
Traced to Anniversary in 1952

Age Groups; Duration from Admission to Disability	Valvular Heart Disease	Arteriosclerotic and Hypertensive Heart Disease	
		Coronary Occlusion	Other, uncomplicated
All Ages, 20-64			
1-10 years	2.7%	3.4%	2.4%
1- 2	*	5.1	3.3
3- 5	4.5	3.3	2.4
6-10	*	2.1	1.6
Ages 40-49			
1-10 years	*	4.3	3.7
1- 5	*	5.1	3.4
6-10	*	*	4.1
Ages 50-64			
1-10 years	*	2.7	1.7
1- 5	*	3.4	2.4
6-10	*	*	*

\*Less than 5 recoveries.

### *Causes of Death*

This part of the analysis includes deaths recorded after the 1952 anniversary of admission to disability. The details are given in Table 6. Among those with valvular heart disease, there were 59 deaths. Of the total, 93 per cent were ascribed to cardiovascular-renal diseases. Heart disease accounted for 90 per cent of the total, with valvular disease specifically reported in 39 per cent.

Among the men with arteriosclerotic-hypertensive heart disease, the total number of deaths was 335. Cardiovascular-renal diseases

accounted for 83 per cent of the total, with nearly three fourths ascribed to heart disease and about half of these specifically to an acute coronary attack. In the cardiac total were 15 per cent in which cerebral or renal complications were contributory causes of death. In an additional 9 per cent, cerebral, renal, and other circulatory diseases were reported as the primary cause of death. Malignant tumors, the only other category with a sizable number of deaths, accounted for 7 per cent of the total. Diabetes was recorded as the cause of 2.4 per cent of the deaths, and in these cases death was due to circulatory complications, chiefly coronary occlusion.

Table 6

Principal Causes of Death Among Men Disabled by Heart Disease  
Number and Per Cent of Total Deaths\* in Two Major Classes of  
Heart Disease

Metropolitan Life Insurance Company, Ordinary Department  
Cases Reported and/or Admitted to Disability in 1934-1936

Cause of Death	Valvular Heart Disease		Arteriosclerotic and Hypertensive Heart Disease	
	Number	Per Cent of Total	Number	Per Cent of Total
Total	59	100.0	335	100.0
Cardiovascular-renal, total	55	93.2	279	83.3
Cardiac, total	53	89.8	248	74.0
Coronary occlusion, total**	8	13.6	123	36.7
Valvular heart disease, total**	23	39.0	1	.3
with cerebral involvement	1	1.7	18	5.4
with renal involvement	3	5.1	24	7.2
with cerebral and renal involvement	1	1.7	7	2.1
Cerebral	1	1.7	20	6.0
Renal	1	1.7	8	2.4
Other circulatory	—	—	3	.9
Cancer, Leukemia and Hodgkin's Disease	2	3.4	23	6.9
Pneumonia	1	1.7	5	1.5
Diabetes	—	—	8	2.4
Other	1	1.7	15	4.5
Not stated	—	—	5	1.5

\*Includes deaths after anniversary in 1952.

\*\*Includes deaths with reported cerebral or renal involvement.



*FOLLOW-UP OF CASES RECOVERED FROM  
DISABILITY*

The experience on men after recovery from disability due to heart disease is of real value today for underwriting. As indicated earlier, this second phase of the study was based on cases insured in the period 1925-1949 whose date of recovery fell within that period. These cases were traced to the anniversary of recovery in 1952, so that the minimum period of follow-up was three years. We adopted a somewhat different classification from that used in the first part of the study, namely, arteriosclerotic heart disease, hypertensive cardiovascular disease, cases not clearly in either group, and valvular heart disease. We further subdivided the arteriosclerotic group according to the reported presence of hypertension, and also according to the presence or absence of a history of occlusion. Unfortunately, the Company's claim forms did not routinely call for blood pressure readings. Consequently, the reporting of hypertension in cases with arteriosclerotic heart disease was incomplete. It is apparent from the data that the group without known hypertension probably includes a considerable number with elevated blood pressure. In interpreting the figures, this fact must be kept in mind. In the small group with valvular heart disease, most were of rheumatic origin, although specific information on the etiology was not routinely available. The hypertensive cardiovascular group includes some with hypertension but without evidence of cardiac impairment. The analysis of the experience on the recovery cases includes the survivorship rates at successive anniversaries of recovery, the ratios of actual to expected mortality, and the causes of death.

The total number of cases in this aspect of the investigation was 649, of whom 200 died up to the anniversary of recovery in 1952. Table 7 shows, for the several categories of those recovered, the number of cases, the age distribution, and the median age. The vast majority of the total—approximately 5 out of 6—were classified as arteriosclerotic heart disease, and among this group occlusion was reported in more than 75 per cent. There was a record of hypertension in only about one fifth of the cases in the arteriosclerotic group. This is obviously out of line with clinical

experience, and consequently it is possible to get only a limited indication of the influence of hypertension in the prognosis of the condition. We recorded the presence of renal or cerebral involvement in all groups, but the number of such cases was too small to warrant separate analysis.

There were relatively few cases under 40. The majority were 50 or over at the time of recovery. The median age was somewhat over 50 years in all groups except in those cases that were not clearly classifiable, and in those with valvular heart disease. In these groups the median age was 45 and 46 years respectively. It may be noted that for comparable classes the median ages in this second cohort are about the same as in the cohort covered in the first phase of our study.

Table 7

Men Recovered from Disability Due to Heart Disease  
Classified by Age at Recovery and by Type of Heart Disease

Metropolitan Life Insurance Company, Ordinary Department,  
Issues of 1925-1949

Disability Cases Terminated by Recovery Between 1925 and 1949

Age Groups	Valvular Heart Disease	Arteriosclerotic Heart Disease				Hyper- tensive*	Not** Classi- fiable
		With Occlusion		Without Occlusion			
		Hyper- tension absent or unknown	Hyper- tension present	Hyper- tension absent or unknown	Hyper- tension present		
Total	41	357	63	81	36	33	38
Under 40	15	21	3	1	2	4	14
40-49	17	132	19	31	13	7	10
50 and over	9	204	41	49	21	22	14
Median Age (years)	45.9	51.1	52.8	51.8	52.1	52.5	45.0

\*Includes hypertension without known cardiac disease.

\*\*As arteriosclerotic or hypertensive.

Cases receiving benefits under contracts with the presumptive provision outnumbered those with the total and permanent provision. As expected, the average duration from disability to recovery for the latter is considerably greater—a year or more—than for cases having the presumptive provision.

Despite the length of the period covered by this experience, the amount of material except for the largest aggregates is rather small for durations beyond 10 years, and in some is rather small even after the 5th year. Consequently, comparisons of survivorship rates presented will be limited to the period up to the 10th anniversary of recovery or up to the point where the number exposed dropped to 5 or less.

Table 8 shows the results in the several groups at successive anniversaries. Among cases recovered from arteriosclerotic heart disease, the short term results are of the same order in cases with and without occlusion, but after the 3rd year, and increasingly so with the passage of time, the results favored those who had no acute episode prior to recovery. Thus, in cases without occlusion and with no record of hypertension, 91 per cent were living at the

Table 8

Survivorship Rates (Per Cent) of Men Recovered from Disability Due to Heart Disease at Specified Anniversaries of Recovery. By Type of Heart Disease

Metropolitan Life Insurance Company, Ordinary Department, Ordinary Issues of 1925-1949. Disability Cases Terminated by Recovery Between 1925 and 1949, Traced to Anniversary of Recovery in 1952

Anniversary	Valvular Heart Disease	Arteriosclerotic Heart Disease				Hyper-tensive*
		With Occlusion		Without Occlusion		
		Hyper-tension absent or unknown	Hyper-tension present	Hyper-tension absent or unknown	Hyper-tension present	
1	90%	96%	97%	99%	97%	94%
2	85	92	92	91	94	88
3	83	88	81	91	92	84
4	80	85	72	88	84	73
5	72	80	72	85	80	73
6	69	76	59	84	75	67
7	66	73	49	77	75	59
8	56	69	49	75	75	59
9	56	65	44	72	75	49
10	56	57	33	68	75	**
Number of Deaths to 10th Anniversary	16	98	27	18	7	12

\*Includes hypertension without known cardiac disease.

\*\*5 lives or less exposed.

second anniversary, 85 per cent at the 5th anniversary, and 68 per cent at the 10th, whereas in the corresponding group with occlusion, the survivorship rates were 92 per cent, 80 per cent, and 57 per cent respectively. For the small group without occlusion who had hypertension, the results were as good as in those with no record of hypertension. For the group who had an acute coronary, the results were generally better in those with no record of hypertension. In the small group with hypertensive-cardiovascular disease the survivorship record was for the most part at a level comparable with the group with a record of occlusion and hypertension. For those with valvular heart disease, the survivorship record was poorer in the first year than in all the other groups, but in the 3rd to 5th years was about the same as in the groups with occlusion and hypertension and with hypertensive-cardiovascular disease. At the 10th year it was as good or better than in those with arteriosclerotic heart disease with occlusion, but poorer than in cases without occlusion.

Data by age are given in Table 9 for the arteriosclerotic group

Table 9

Survivorship Rates (Per Cent) of Men Recovered from Disability Due to Heart Disease at Specified Anniversaries of Recovery. By Age Groups at Recovery and by Type of Heart Disease

Metropolitan Life Insurance Company, Ordinary Department, Ordinary Issues of 1925-1949. Disability Cases Terminated by Recovery Between 1925 and 1949, Traced to Anniversary of Recovery in 1952

Anniversary	Arteriosclerotic Heart Disease			
	With Occlusion		Without Occlusion	
	Ages 40 to 49	Ages 50 and over	Ages 40 to 49	Ages 50 and over
1	96%	96%	98%	99%
2	94	91	91	93
3	88	87	88	93
4	84	84	86	87
5	76	82	83	83
6	69	78	80	81
7	61	75	80	74
8	60	71	80	71
9	56	66	80	68
10	42	59	80	64
Number of Deaths to 10th Anniversary	54	63	8	17

subdivided according to the presence or absence of a record of occlusion. These were the only classes with a sufficient number of cases for analysis. In cases with a record of occlusion, the results prior to the 5th anniversary at ages 40 to 49 at recovery were about the same as in the group 50 and over, but thereafter were inferior. In the group without occlusion, the results were similar in the two age groups up through the 6th year, but from the 7th to 10th years were better in the younger group. However, the number of cases in this category was too small for the age differences at the longer duration to be of much significance.

The survivorship record at ages 40 to 49 on cases with occlusion was as good as that in cases without occlusion up through the 4th year; subsequently the small experience on the latter was the better. At ages 50 and over, the results in the two groups were generally similar throughout.

#### *Comparison of Actual and Expected Mortality*

Ratios of actual to expected mortality covering the ten year period after recovery are given in Table 10 for the cases with valvular heart disease and for those with arteriosclerotic heart disease, subdivided according to the presence or absence of a record of coronary occlusion. As in the first phase of the study, the mortality was consistently greater than expected, and the ratios were lower for those with arteriosclerotic heart disease than for those with valvular heart disease. In the aggregate, the observed deaths in the arteriosclerotic group were about  $3\frac{1}{2}$  times the expected as compared with nearly 8 times the expected for those with valvular heart disease. In the arteriosclerotic group, the mortality ratio was appreciably less in those with no record of an acute coronary than in those who had an acute coronary—approximately  $2\frac{1}{2}$  and 4 times the expected respectively. There was no consistent trend in the ratios by duration.

The ratios of observed to expected deaths showed a pronounced decline with advancing age. The ratios were highest at ages under 40, but are not shown because the number of deaths was so small. Among those with arteriosclerotic heart disease with a record of coronary occlusion, the observed deaths among men 40 to 49 at recovery was  $8\frac{3}{4}$  times the expected, as against about  $2\frac{1}{2}$  times the expected in the age group 50 and over. In those without a

Table 10  
Ratios of Actual to Expected\* Deaths Among Men Recovered from Disability  
Due to Heart Disease. By Age Groups at Recovery and Specified Duration  
and by Type of Heart Disease

Metropolitan Life Insurance Company, Ordinary Department, Ordinary Issues  
of 1925-1949. Disability Cases Terminated by Recovery Between 1925 and 1949,  
Traced to Anniversary of Recovery in 1952

Duration from Recovery (Years)	All Ages, 20 and over				Ages 40 to 49				Ages 50 and over			
	Years of Life Exposed	Actual Deaths	Per Cent Actual of Expected Deaths		Years of Life Exposed	Actual Deaths	Per Cent Actual of Expected Deaths		Years of Life Exposed	Actual Deaths	Per Cent Actual of Expected Deaths	
Valvular Heart Disease												
1-10	271	16	780		83	11	1,890		58	3		280
1-5	175	11	870		63	9	2,250		41	2		290
6-10	96	5	650		20	2	1,100		17	1		260
Total Arteriosclerotic Heart Disease												
1-15	3,339	160	340		1,216	66	720		1,947	86		230
1-5	2,275	98	350		833	39	730		1,330	52		240
6-10	873	52	350		309	23	820		517	28		230
11-15	191	10	220		74	4	380		100	6		180
Arteriosclerotic Without Coronary Occlusion												
1-10	727	25	250		273	8	410		435	17		210
1-5	500	17	280		189	7	580		298	10		200
6-10	227	8	200		84	1	130		137	7		220
Arteriosclerotic With Coronary Occlusion												
1-10	2,421	125	390		869	54	880		1,412	63		240
1-5	1,775	81	380		644	32	780		1,032	42		250
6-10	646	44	400		225	22	1,070		380	21		240

\*Based on Intercompany Experience on Standard Insurance at durations 16 years and over in 1939-1950.

record of acute coronary, these ratios were respectively 4 and 2 times the expected. The relatively poor showing in the acute coronary group at all ages combined is thus largely due to the high ratio at ages 40 to 49. The difference between this group and those without an acute coronary was comparatively small at ages 50 and over.

#### *Comparative Results —*

##### *Presumptive Versus Total and Permanent Provision*

Comparison of the survivorship record under the presumptive and the total and permanent provision was limited to the cases with arteriosclerotic heart disease, the only group large enough to warrant this detailed analysis. The results are shown in Table 11. The record under the presumptive provision was somewhat better throughout. For example, for all cases with arteriosclerotic heart disease, the survivorship rate at the end of the 5th year was 82 per cent in the presumptive group, as against 77 per cent under the total and permanent provision. At the end of the 10th year the rates were 60 per cent and 54 per cent respectively. The differences were somewhat greater at ages 40 to 49 than at ages 50 and over. In the younger age group the 5th year survivorship rate in presumptive cases was 82 per cent as against 71 per cent in the total and permanent group and the 10th year rates were 55 per cent and 45 per cent respectively. At ages 50 and over, the 5th year survivorship rate in the presumptive group was 83 per cent as against 81 per cent in the total and permanent disability group, and the 10th year rates were 64 per cent and 58 per cent respectively. These tendencies were found for the most part also in the separate categories, classified according to presence or absence of a record of acute coronary occlusion. Since the total and permanent disability provision was the earlier of the two, the downward trend in mortality may account for part of the differences in survivorship between the two classes.

#### *Causes of Death*

The data on causes of death given in Table 12 includes information on those cases dying following the 1952 anniversary of recovery. Of the 19 deaths in the group with valvular heart disease, all but 3 were ascribed to cardiovascular-renal diseases, and all but

Table 11

Survivorship Rates (Per Cent) of Men Recovered from Disability Due to Heart Disease at Selected Anniversaries of Recovery. Cases Insured Under Contracts with the Presumptive and Those with the Total and Permanent Provision Compared. By Age Groups at Recovery and Type of Heart Disease

Metropolitan Life Insurance Company, Ordinary Department, Ordinary Issues of 1925-1949, Disability Cases Terminated by Recovery Between 1925 and 1949, Traced to Anniversary of Recovery in 1952

Anniversary	Presumptive			Total and Permanent		
	All Ages, 20 & over	40 to 49	50 & over	All Ages, 20 & over	40 to 49	50 & over
Total Arteriosclerotic Heart Disease						
1	96%	97%	96%	97%	96%	97%
3	88	88	88	89	88	90
5	82	82	83	77	71	81
7	74	72	76	67	57	73
10	60	55	64	54	45	58
Number of Deaths to 10th Anniversary	86	34	45	64	28	35
Arteriosclerotic Without Coronary Occlusion						
1	100%	100%	100%	96%	96%	96%
3	91	86	93	92	91	93
5	85	86	84	82	81	83
7	80	*	75	73	75	72
10	76	*	71	64	75	56
Number of Deaths to 10th Anniversary	12	3	9	13	5	8
Arteriosclerotic With Coronary Occlusion						
1	95%	96%	95%	97%	96%	97%
3	87	89	86	88	86	89
5	81	81	83	76	66	80
7	72	69	77	65	49	73
10	55	50	54	50	30	58
Number of Deaths to 10th Anniversary	74	31	36	51	23	27

\*5 lives or less exposed.

one of these were ascribed to cardiac disease. Valvular heart disease was the specific cause in 7 deaths, or about one-third of the total.

Of the 204 deaths recorded among men with arteriosclerotic and hypertensive heart disease, seven-eighths were ascribed to cardiovascular-renal diseases. The overwhelming proportion died from



Table 12

Principal Causes of Death Among Men Recovered from Disability  
Due to Heart Disease  
Number and Per Cent of Total Deaths\* in  
Two Major Classes of Heart Disease

Metropolitan Life Insurance Company, Ordinary Department,  
Issues of 1925-1949, Disability Cases Terminated by Recovery  
Between 1925 and 1949

Cause of Death	Valvular Heart Disease		Arteriosclerotic and Hypertensive Heart Disease	
	Number	Per Cent of Total	Number	Per Cent of Total
Total	19	100.0	204	100.0
Cardiovascular-renal, total	16	84.2	179	87.7
Cardiac, total	15	78.9	170	83.3
Coronary occlusion, total**	3	15.8	121	59.3
Valvular heart disease, total**	7	36.8	2	1.0
with cerebral involvement	1	5.3	8	3.9
with renal involvement	1	5.3	5	2.5
with cerebral and renal involvement	—	—	—	—
Cerebral	—	—	5	2.5
Renal	1	5.3	2	1.0
Other circulatory	—	—	2	1.0
Cancer, Leukemia and Hodgkin's Disease	1	5.3	9	4.4
Pneumonia	1	5.3	1	.5
Diabetes	—	—	1	.5
Other	—	—	6	2.9
Not stated	1	5.3	8	3.9

\*Includes deaths after anniversary of recovery in 1952.

\*\*Includes deaths with reported cerebral or renal involvement.

heart disease. Acute coronary occlusion was responsible for about three-fourths of the cardiac deaths, and nearly three-fifths of the total mortality. Outside the cardiovascular-renal causes, the only other major cause of death was malignant disease, with 9 deaths or 4.4 per cent of the total.

### Discussion

What emerges from the detailed analysis of these groups are some needed facts on the outlook for persons with heart disease. There still remains an undue degree of pessimism regarding it

among physicians, and even more among the general public. Without minimizing the adverse aspects of either the immediate or long range prognosis, this type of investigation furnishes data to correct false impressions in the matter. Thanks to follow-up studies by clinicians in centers such as the Massachusetts General Hospital<sup>5,6,7</sup>, the Mayo Clinic<sup>8,9</sup>, and Mt. Sinai Hospital in New York<sup>10,11</sup>, physicians are being made aware that heart disease is compatible with many years of useful life. This study is another link in the chain of evidence supporting this concept.

The material upon which the present study is based has certain limitations but these probably are outweighed by some distinct advantages. The data are more representative of the population at large than are those of an individual practitioner or clinical group. Even more important, it is possible from the data derived from insurance experience to make long range and fairly accurate measurements of longevity and of the influence of certain pertinent factors on the course of heart disease.

The results of the study can be useful in cardiac rehabilitation programs both to the administrators and to the clientele. A primary obstacle in the rehabilitation of cardiacs is the patient's fear that he may further damage his heart if he resumes work. The facts we have gathered should be reassuring to cardiac patients by showing them that they have a good chance to live many years and to engage safely in productive activity.

The results also have potential value for the life insurance industry. They give information helpful in administration of claims and throw light on problems of underwriting risks with heart disease. Particularly with the extension of substandard insurance, there is need for reliable statistical information on the insurability of persons with cardiac impairments who in the past were rejected for insurance.

On the whole, the picture revealed by these statistics is encouraging. It is especially so for the groups with arteriosclerotic heart disease, and even for those among them who have experienced a coronary occlusion. The mortality is higher than normal throughout but, after all, we are dealing with men who had severe chronic cardiac impairment entailing extended periods of disability. Despite this, a significant proportion in each group

survived for years. Many of them subsequently resumed work, and even more could have done so.

Both aspects of this study indicate clearly that valvular heart disease at the stage at which disability occurs carries a less favorable outlook than does arteriosclerotic-hypertensive heart disease. Perhaps the basic reason is that persons with valvular disease who become disabled have severe and progressive damage to the valves and myocardium, and greatly diminished cardiac reserve. As against this, those with arteriosclerotic-hypertensive heart disease usually have slower progression of the process and less impairment of the cardiac reserve. Moreover, the physical and emotional impact of the typical coronary occlusion forcibly impresses patients with the necessity for moderation in living and working habits. In part, however, the relatively good results recorded for those with a history of occlusion may reflect an initial selection due to the automatic exclusion from the study of cases which terminate fatally in or shortly after their attack.

It is likely that future studies of prognosis in heart disease will yield results even more favorable than those reported here. Surgical correction of rheumatic mitral stenosis which now is being used with increased frequency, is restoring many persons disabled by this condition to working capacity and normal living. The outlook for such cases is immeasurably better than in the past. Moreover, operations being developed for other types of valvular disease may be expected to reduce the disability and mortality from these conditions, while prophylactic therapy now available largely prevents recurrent rheumatic activity and reduces the chance of progression to valvular heart disease. In like manner, though in lesser degree, the longevity of patients with degenerative heart conditions is increasing, thanks to the use of anti-coagulants and other new measures in the treatment of acute coronary occlusion and to the improved therapeutic and dietetic management of patients with established coronary and hypertensive heart disease.

There is need for further intensive research into the factors influencing the prognosis of heart disease, as for example, overweight, build, family history, occupation, diet, and race. Further analysis of the present material is planned in order to study those factors on which information is available from the records.

*SUMMARY*

Two groups of men who received disability benefits under supplementary contracts have been followed over a period of years. The first consisted of 540 who were admitted to disability between 1934 and 1936; the second, of 649 who recovered from disability between 1925 and 1949. Both groups were traced to the 1952 anniversary of admission and recovery respectively. Study was made of the longevity and mortality of these men by type of heart impairment, age, and duration of observation.

Men with arteriosclerotic-hypertensive heart disease, a high proportion of whom had had a coronary occlusion, constituted the majority of the cases studied. These men were mostly between ages 40 and 60 at entry in both parts of the experience, with a median age in the early 50's. A small proportion had valvular heart disease, primarily rheumatic in origin. These were somewhat younger than the preceding group.

The survivorship record, based upon follow-up either from date of disability or recovery, was generally better for those with arteriosclerotic-hypertensive heart disease than for those with valvular heart disease. The record was least favorable in those having cerebral or renal complications of arteriosclerotic heart disease. In the group studied from date of disability, 70 per cent of the men with coronary occlusion lived five years or longer, and about half of them, for ten years or longer. For those with valvular heart disease, the survivorship rates were 44 per cent at five years and 27 per cent at ten years. There was comparatively little difference in the results between those who experienced coronary occlusion and those who did not.

Generally, the survivorship results were better for those under 50 than those over that age. Even where this was so, the difference was less than the expected in view of the normal increase in mortality with age. This is brought out by the ratios of actual to expected deaths. These ratios are uniformly higher at ages under 50 than over 50.

Study of the recovery rates after disability disclosed that appreciable numbers were able to resume work. The recovery record was better in those who had had a coronary occlusion than in the

other groups tabulated. The rates of recovery declined with age and with the period of time elapsed following admission to disability.

The mortality in all divisions of this study was consistently greater than normal. Among the men followed from the date of disability, the mortality ranged from approximately three times the expected in the older men with uncomplicated arteriosclerotic and hypertensive heart disease and in those with coronary occlusion to more than 10 times the expected for younger men with renal and cerebral complications of arteriosclerotic heart disease or with valvular heart disease.

Of special interest to life underwriters is the mortality experience on men recovered from heart disease. Among such cases, properly selected, will be found applicants who may qualify for substandard insurance which in many companies now includes classes with mortality limits above those previously in vogue. It is notable, therefore, that in men in the age group 50 and over recovered from arteriosclerotic heart disease the subsequent mortality was approximately  $2\frac{1}{2}$  times the expected. This was found both in those with and those without a history of coronary occlusion. The small group of men at ages 40 to 49 without occlusion had a mortality about four times the expected but in men with a history of occlusion, a much larger group, had a mortality nearly nine times the expected. In this age period the mortality ratio for men with valvular heart disease was far higher.

The vast majority of deaths were due to heart and other circulatory diseases. The specific causes of death reported reflected the type of disease that led to the original disability. Cancer was the most frequent of the non-cardiac causes of death.

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PRESIDENT BONNETT — Thank you, Mr. Marks. Before continuing with our program I should like to take a short time for a discussion of the Life Insurance Medical Research Fund. Dr. Dieuaide will talk to us about the activities of the Fund and tell us anything that might be of interest to the companies and the executives of those companies which contribute to it. I am pleased to introduce Dr. Francis R. Dieuaide, Scientific Director, Life Insurance Medical Research Fund.

DR. FRANCIS R. DIEUAIDE — Mr. President, Members of the Association: It is seven years this autumn since the Life Insurance Medical Research Fund was established as the result of enlightened self-interest and public spirit on the part of a large group of life insurance companies, both big and little.

In 1953, through the contribution of member-companies, over \$800,000 has been provided for the support of carefully selected research on heart disease, which, as you all well know, is by far the greatest cause of death in our society today.

This year's allocations bring the total given to the Fund to over \$5.5 million. The Fund's awards have aided research in 97 different institutions, which are widely distributed throughout the United

States and Canada. Research workers all over the country have emphatically expressed their appreciation of the existence of this Fund as a source to which they can turn for non-governmental support, particularly of their basic research.

The Fund, of course, is by far the largest single source of non-governmental aid for research in the field of cardiovascular disease. You will be interested to know that the story of the Fund, as an activity of private enterprise conducted for the public good, as well as for the good of policyholders, was presented in evidence only the other day before the Congressional House Committee on Interstate Commerce, in the course of their extended hearings on the national health and its preservation, a subject on which your further program this morning bears closely.

Current research results indicate substantial progress towards a better understanding of hypertension and especially of arteriosclerosis. Particularly noteworthy is entirely new knowledge of processes regulating cholesterol metabolism. Results now in hand provide a number of points of attack which may ultimately lead to a method for the control of arteriosclerosis.

The Fund's Annual Report for 1952-1953 will be sent to all Medical Directors within the next fortnight. We hope that all of you will find time to look this report over, and especially to read the summary provided in it of current research results. Criticisms and comments on the contents and make-up of the report will be very gratefully received.

We are also distributing an attractive folder containing a summary of the Fund's work in non-technical language, which it is believed will particularly interest the non-medical executive officers of the companies. We hope you will call it to their attention if they do not see it otherwise.

This past summer the Fund office was moved. It is now in a new building in midtown New York, 345 East 46th Street. We extend to all of you a cordial invitation to visit the office any time. We would heartily welcome the opportunity to see you there and tell you more about the operation of the Fund.

I want to take this occasion to say that I deeply appreciate the assistance and support of the Medical Directors' representatives

who are appointed both by this Association and by the Medical Section of the American Life Convention. The occasions and matters on which I came to them for help are numerous and varied. The response received is always generous and always effective.

PRESIDENT BONNETT — Thank you, Dr. Dicuaide. I also want to tell you how interesting it is to watch private funds working in allotments for scientific investigation, and that the Advisory Council carefully studies every project.

So many of our companies are entering the field of accident and health-hospitalization insurance that we have all become aware of the problems with which the Health Insurance Council has been struggling for years. For that reason it was felt advisable to devote the final session of the 62nd Annual Meeting to accident and health-hospitalization insurance. This is the first time that this Association has considered the subject to any serious extent. To show you that we are not entirely alone in progress, and I think it can only be described as progress, the Life Underwriters Association of Greater New York held its first panel discussion on the writing of this type of insurance on September 23, 1953.

The three presentations which have been prepared for your attention will cover considerable ground, some of it closely inter-related. It has been suggested, therefore, that all questions be held until the end of the panel discussion, and so that you will not forget your questions, cards have been provided for you to write them out and send them to the platform. On completion of the panel discussion, the questions will be reviewed by the panel members and by Dr. Williams and Dr. Horan. In this way, we hope to save time and receive answers to all the significant inquiries.

Our first paper is titled, "One Year's Experience in Family Hospital and Surgical Expense Insurance," by Dr. Ennion S. Williams, Medical Director, Life Insurance Company of Virginia. He has been active in this association and also the Medical Section of the American Life Convention, and needs no introduction. I think we should all know, however, that Dr. Williams has been very active and useful in the Health Insurance Council, particularly with the Virginia Medical Society, in working out methods and plans for collaboration with those interested in prepaid insurance. It is my pleasure to introduce Dr. Williams.



## ONE YEAR'S EXPERIENCE IN FAMILY HOSPITAL AND SURGICAL EXPENSE INSURANCE

ENNION S. WILLIAMS, M. D.

*Medical Director*

*The Life Insurance Company of Virginia  
Richmond, Virginia*

Twenty years ago, being a very junior practitioner of medicine, I was designated by a group of my seniors to make a summary of some of the new so-called prepayment hospitalization plans existing in Dallas and Cleveland. I was also asked to summarize Federal encroachments on the practice of medicine through the Civilian Conservation Corps, Public Works Administration, and Works Progress Administration programs. I can remember collecting facts and expressing an opinion to the effect that a prepayment plan could not work; that it would increase the total cost of medical care and overload physicians' time and hospital facilities with unnecessary demands because it was prepaid. I predicted that a postpaid plan would be the answer to the problem of meeting the cost of medical care.

How wrong I was! There are now over 90 million persons with prepaid hospitalization insurance.

The first major influence was the Blue Cross movement. Hospitalization written by insurance companies now covers more persons than does Blue Cross. Recently, there has been increased activity in the field of individual hospital and surgical insurance by insurance companies. It is generally agreed that this is a sphere of insurance most susceptible to public misunderstanding and criticism and most in need of a public relations program. Its very nature invites anti-selection and demands restrictions. It is difficult and complex and is unfortunately the phase of insurance that has been assigned to me to discuss today. I do not intend either to praise it or to make an apology. We should study its complex and difficult structure, its implications, and the results of experience, in order that effective means may be developed to finance the cost of medical care.

The Life Insurance Company of Virginia began writing individual hospitalization and surgical insurance on a weekly premium basis in February 1951. It appeared that the national political trend was veering away from compulsory governmental health insurance. Medical societies generally were adopting a policy of endorsing the writing of health insurance by insurance companies as well as by the Blue Cross and Blue Shield organizations. Life companies were insuring large numbers of persons against loss due to hospital and surgical expense by group contracts. It was believed by our company that there was a need for hospital and surgical insurance written on an individual or family basis and that the largest market probably existed among the clientele served by our weekly premium agency force. A policy was devised that provided daily hospital benefits on the reimbursement basis for \$5, \$7 or \$9 for 90 days; hospital extras up to \$50; first aid rendered in hospitals up to \$25; hospital maternity benefits up to \$50; surgical benefits according to the \$200 group schedule, excluding obstetrical fees; poliomyelitis benefits up to \$5,000 per case and a final clause, apparently typical of weekly premium policies, that provided benefits for loss of limbs, loss of eyesight, or accidental death.

This policy was introduced gradually through the field by traveling teams of agency training supervisors. Great stress was placed on the educational aspects during this period, in order that the exclusions necessary for writing individual health insurance could be properly explained to the buying public. An attempt was made to simplify these exclusions as much as possible. Said exclusions concerned mainly the so-called waiting periods. No specific conditions except pregnancy were listed. There was no waiting period for accidents. Conditions not involving surgery were covered if they became manifest after the first 30 days. Conditions that do involve surgery were covered if they became manifest after 90 days. There was a 10-month waiting period for pregnancy.

Accidents covered by Workmen's Compensation were excluded. This eliminates the necessity of occupational underwriting and avoids double coverage for occupational accidents.

The medical problems encountered initially concerned the selec-

tion process. An application form for listing a whole family's history on one blank was devised. It stressed, mainly, past medical history and the existence of defects that might require surgical treatment. No medical examinations were secured. Each application had a detachable authorization to consult physicians and hospitals, and such inquiries are made rather freely. Physicians and hospitals are requested to set their own fees for this service. Commercial inspection reports are used only in selected cases; or for experimental "spot checking".

As a basis for preparing an underwriting guide, a survey was made of histories admitted on several thousand nonmedical life applications. A list was prepared of conditions that could be disregarded. These were conditions considered trivial or conditions that by nature were not recurrent or progressive. The remaining conditions were listed with rules showing action; that is, whether rejectable or whether waivers should be applied. No attempt was made to rate cases other than by waivers.

Between February, 1951, and September 1, 1953, approximately 105,000 applications were received, of which 95,000 were issued. Forty thousand claims have been received. As of September 1, 1953, there were 63,000 policies in force covering 153,000 persons. There were riders waiving coverage on certain conditions on 9 per cent of the individuals. In the underwriting procedure, attending physicians or hospitals were written on approximately 15 per cent of the applications. An analysis of these letters showed a somewhat different pattern from that found in a study of life applications. There was a higher percentage of unfavorable action resulting from this procedure. This may be due in part to the fact that no medical examinations were secured. Action was affected unfavorably on almost 50 per cent of the cases when there was correspondence with the attending physician or hospital. This consisted either of rejection or of the placing of a waiver on the policy. Inspection reports were secured on only approximately 6 per cent of the applications.

For a report on our claims, I am indebted to my actuarial associates Messrs. Glazier and Wirth<sup>1</sup> who have recently studied this experience. Hospital claims are usually measured by the annual admission rate (claim frequency) and the average duration of

stay. The product of these two factors gives the number of hospital days per year per life insured and this is the annual claim cost of \$1.00 of hospital daily benefit.

For the purpose of rough comparison, some published data have been reviewed.

In 1934 Fitzhugh<sup>2</sup> reported the 1928-1933 experience on Home Office employees at the Metropolitan Life. The annual admission rate per 100 lives was 5.1 for males and 6.0 for females with an average stay of 9.7 and 9.1 days respectively.

In 1943 Hunter and Thompson<sup>3</sup> reported the experience of a Blue Cross Plan. The admission rate was 5.8 per cent per year for males and 7.1 per cent per year for females. The average stay for both sexes combined was 10.6 days.

In 1952 Gingery<sup>4</sup> reported an inter-company study of 1950 group experience. For a 70-day employee plan the admission rate was 7.8 per cent for males, and 8.6 per cent for females (non-maternity). The average stay was 8 days for males and 8.8 days for this female group.

Blue Cross experience for 1952 has been reported as showing an admission rate of 12.6 per cent with an average stay of 7.4 days. There has been a gradual steady rise in the Blue Cross admission rate during the past 5 years and a slight lessening in the average stay.

Although the experiences quoted are not exactly comparable, they do indicate an increasing hospital admission rate. Total admissions to registered hospitals in the United States increased from 7,155,976 in 1931 to 18,237,118 in 1951.

The Life Insurance Company of Virginia experience studied covers the period between July 1, 1952, and June 30, 1953, roughly the second year of full operation.

Life years exposed in this period were as follows:

Adult males .....	31,780
Adult females .....	40,189
Children .....	47,844

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Total ..... 119,813

Adult females (maternity) 23,727 (included above).

Owing to the large proportion of new business in the exposure, claim costs should be adjusted to allow for the effect of unexpired waiting periods. It is estimated that the following factors should be employed to give a full year's claim frequency.

Hospitalization	
Result of injury .....	1.00
Result of sickness, not involving surgery .....	1.05
Result of sickness, involving surgery .....	1.20
Hospitalization (all causes) .....	1.15
Surgical .....	1.20
Maternity .....	2.00

The hospitalization experience is summarized in Table I. The annual admission rate is on the basis of claims per 100 lives per year. It may be noted that for adult males both the admission rate and the average length of stay increase steadily with age. The same is true for females with one exception. There was a drop in the admission rate at the 50-60 age group. The combined admission rate for adults and children with maternity claims excluded was 12.1 per hundred per year. With maternity claims included this rate was 13.7. The Blue Cross rate for 1952 was 12.6. With the population of the United States estimated as 158,000,000, the admission rate for general hospitals for the population as a whole would be 11.2 per hundred per year.<sup>5</sup>

The average stay for adults and children combined was 5.4 days. The average stay in non-governmental general hospitals in the United States in 1952 was 7.5 days.<sup>5</sup> The relative short stay in this experience is noteworthy in view of the fact that it is a 90 day plan and has no limitation for neuro-psychiatric conditions, tuberculosis or other long-term illnesses.

The excess claim frequency of adult females as compared with adult males and children should be noted. The adult experience was also tabulated by marital and family classification. Husbands, with wife only, or wife and children, yielded a distinctly better experience than individual males or father and children only, due probably to less anti-selection. Wives, with husband and children, yielded a better experience than other adult females.

TABLE I  
Hospitalization  
Annual Basis

Age	No. of Hospital Claims	Claim Frequency %	Average Duration Days	Hospital Days per Life
<i>Adult Male</i>				
15-19	180	8.7	4.4	.39
20-29	792	9.0	4.7	.42
30-39	935	10.1	5.9	.60
40-49	911	12.9	6.7	.86
50-61	621	13.5	7.2	.98
All Ages	3439	10.8	6.0	.65
<i>Adult Female — Non Maternity</i>				
15-19	385	12.1	4.2	.51
20-29	1987	15.5	5.4	.84
30-39	1856	17.5	6.4	1.13
40-49	1700	20.5	7.2	1.48
50-61	905	17.0	7.6	1.29
All Ages	6833	17.0	6.4	1.09
<i>Children</i>				
0-18	4475	9.4	3.6	.33

Table II illustrates hospital extra charges. The average charge was very uniform by age and sex. The excess of claim cost in this category for females is due largely to the higher admission rate.

TABLE II  
*Miscellaneous Extras*

Age	Average extras paid per claim (\$50 max.)	Claim cost per life
<i>Adult Male</i>		
15 - 19	\$33	\$2.9
20 - 29	34	3.1
30 - 39	34	3.4
40 - 49	35	4.5
50 - 61	36	4.9
All Ages	35	3.8
<i>Adult Female — Non Maternity</i>		
15 - 19	31	3.8
20 - 29	36	5.6
30 - 39	37	6.5
40 - 49	38	7.8
50 - 61	37	6.3
All Ages	36	6.1
<i>Children</i>		
0 - 18	31	2.9

Table III illustrates the experience with the first aid provision. This covers hospital charges for out-patient care rendered because of accidents. The average claim is fairly uniform for age and sex. The claim frequency is also fairly constant except for a somewhat high rate for children.

TABLE III

*First Aid*

Age	No. of first aid hospital claims	Claim frequency %	Average claim (\$25 max.)	Claim cost per life
<i>Adult Male</i>				
15 - 19	99	4.8	\$10	\$ .48
20 - 29	282	3.2	10	.32
30 - 39	276	3.0	9	.28
40 - 49	194	2.8	10	.27
50 - 61	80	1.7	12	.21
All Ages	931	2.9	10	.30
<i>Adult Female — Non Maternity</i>				
15 - 19	52	1.6	11	.18
20 - 29	214	1.7	14	.23
30 - 39	219	2.1	11	.23
40 - 49	169	2.0	12	.24
50 - 61	97	1.8	11	.19
All Ages	751	1.9	12	.22
<i>Children</i>				
0 - 18	2213	4.6	8	.37



Table IV illustrates the claim experience on women who have maternity coverage. The policy provides maternity coverage only if the husband is also insured. In the group so covered the claim frequency was 7.3 per cent. Because of the 10-month waiting period, it is estimated that the actual maternity rate in this group would be about double this figure. This would make the present experience considerably higher than the 1950 group experience on dependent spouses, which was estimated by Gingery<sup>4</sup> as 8.1 per cent for the 10 X plan. It is comparable to 1949 birth rates among married women in the United States as derived from current Vital Statistic reports.<sup>1</sup>

TABLE IV

Maternity

Age	Life years exposed	No. of maternity claims	Claim frequency %
<i>Wives (When Husband Insured)</i>			
15 - 19	1426	227	15.9
20 - 29	8162	1100	13.5
30 - 39	7428	364	4.9
40 - 49	4918	49	1.0
50 - 61	1793	0	0
All Ages	23727	1740	7.3

Table V illustrates the surgical-expense experience. There were 11,749 surgical claims as compared to 14,747 hospital admissions. The children actually had more surgical operations than hospital admissions. Women had a higher claim frequency and a higher average claim than men. This produced a claim cost for women double that for men. The surgical-claim frequency for men, women and children combined was 9.8 per hundred lives per year. From data reported by Smith<sup>6</sup> in 1951 the non-maternity Blue Shield surgical claim frequency was 10.5 per hundred per year in 1948. The average claim in our experience was \$46 as compared to \$41 for Blue Shield in 1948.

TABLE V

*Surgical Expense*

Age	No. of surgical claims	Claim frequency %	Average claim (\$200 max.)	Claim cost per life
<i>Adult Male</i>				
15 - 19	170	8.3	\$40	\$3.3
20 - 29	684	7.7	37	2.8
30 - 39	681	7.4	40	3.0
40 - 49	592	8.4	49	4.1
50 - 61	365	7.9	54	4.3
All ages	2492	7.8	44	3.4
<i>Adult Female — Non Maternity</i>				
15 - 19	255	8.0	53	4.2
20 - 29	1364	10.7	60	6.4
30 - 39	1272	12.0	69	8.3
40 - 49	1045	12.6	75	9.5
50 - 61	503	9.5	62	5.9
All ages	4439	11.0	66	7.3
<i>Children</i>				
0 - 18	4818	10.1	30	3.0

Table VI shows the percentage of claims for the more common diagnoses with men, women, and children listed separately. Table VII is a similar listing of surgical operations. The outstanding feature of both of these tables is the high percentage of gynecological conditions. This was anticipated in that 24 per cent of all riders applied in underwriting waiver benefits were for these disorders. Next to appendectomies, hernia operations are the most costly surgical procedures for men. The hernia waiver is the most common applied to male applicants.

TABLE VI

Percentage of total reimbursement in each age group for  
Hospital Expense, Excluding First Aid, Maternity, and Polio

## BY DIAGNOSIS OF SICKNESS

Age	15-19	20-29	30-39	40-49	50-61	Total by Amt.	Total by No.
<b>Diagnosis</b>	<b>Adult Male</b>						
Respiratory	14.3	18.6	14.8	13.9	13.7	15.0	18.4
Accidental Injury	17.6	15.3	15.9	7.2	8.9	11.9	12.5
Stomach & Duodenum	6.2	7.4	10.6	10.6	10.4	9.7	10.5
Appendicitis	21.0	12.7	7.5	5.0	2.2	7.3	6.3
Veins & Circulatory	—	4.1	8.1	9.1	8.1	7.2	6.4
Urinary Tract	2.1	5.6	5.8	5.9	8.1	6.1	4.1
Hernia	3.3	4.3	3.7	7.0	6.8	5.4	4.1
Heart & Arteries	1.7	1.5	3.5	6.8	9.2	5.2	3.4
Intestinal	3.6	2.4	5.0	6.5	4.7	5.8	5.1
Osteomyelitis, etc.	3.4	2.6	4.8	4.0	5.4	4.2	3.5
Sub-Total	73.2	74.5	79.7	76.0	77.5	76.8	74.3
Miscellaneous	26.8	25.5	20.3	24.0	22.5	23.2	25.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	<b>Adult Female</b>						
Female Genital	20.0	28.8	31.4	26.6	14.8	26.1	22.7
Respiratory	19.2	14.0	10.3	9.6	13.6	11.9	15.1
Urinary Tract	6.9	6.7	6.7	5.2	7.0	6.3	7.0
Veins & Circulatory	2.3	3.5	6.1	7.8	6.9	5.8	5.3
Accidental Injury	6.7	5.4	5.0	5.8	7.5	5.7	5.9
Appendicitis	22.2	9.8	3.3	1.5	1.3	5.0	4.5
Liver, Gallbladder	1.8	3.1	4.1	6.7	8.1	4.9	4.3
Stomach & Duodenum	2.4	2.9	5.1	6.0	5.9	4.8	5.3
Intestinal	3.4	3.4	4.4	4.9	4.6	4.3	4.5
Osteomyelitis, etc.	0.5	0.9	2.6	3.8	2.0	2.3	2.8
Sub-Total	85.4	78.5	79.0	77.9	71.7	77.1	77.4
Miscellaneous	14.6	21.5	21.0	22.1	28.3	22.9	22.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	<b>Children</b>						
Respiratory						47	57
Accidental Injury						13	11
Appendicitis						10	6
Sub-Total						70	74
Miscellaneous						30	26
Total						100	100

TABLE VII

Percentage of total reimbursement in each age group for  
Surgical Operation Expense, excluding First Aid, Maternity and Polio

BY TYPE OF SURGICAL OPERATION

<u>Age</u>	<u>15-19</u>	<u>20-29</u>	<u>30-39</u>	<u>40-49</u>	<u>50-61</u>	<u>Total</u> by Amt.	<u>Total</u> by No.
<u>Operation</u>							
<u>Adult Male</u>							
Appendectomy	38.6	29.9	19.4	13.3	4.5	18.8	8.3
Hernia	7.0	8.7	9.4	18.2	19.0	13.2	5.4
Fracture	15.2	10.1	8.4	6.5	7.3	8.5	10.3
Hemorrhoid	.5	4.5	8.3	9.2	7.2	7.0	5.9
Skin Surgery	6.1	6.0	7.6	5.0	3.4	5.7	20.4
Benign Tumors	3.6	5.8	6.0	3.9	6.5	5.3	14.5
Tonsils & Adenoids	7.0	8.9	3.8	1.1	0.7	3.9	5.6
Resection of Stomach, Rectum or Bowel	—	1.7	5.1	4.5	5.6	3.9	.9
Cystoscopy	0.8	2.7	4.1	4.9	4.4	3.8	4.5
Gallbladder	—	0.6	1.0	5.1	3.4	2.4	0.7
Sub-Total	78.8	78.9	73.1	71.7	62.0	72.5	76.5
Miscellaneous	21.2	21.1	26.9	28.3	38.0	27.5	23.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
<u>Adult Female</u>							
Gynecology	19.9	42.3	54.5	49.9	31.1	45.8	31.4
Appendectomy	43.6	19.1	6.3	3.0	4.7	10.5	6.7
Gallbladder	1.2	3.2	3.9	5.5	9.5	4.6	2.0
Hemorrhoid	0.8	2.2	4.5	5.6	5.2	4.1	4.8
Thyroid Gland	—	3.3	3.4	4.8	1.8	3.4	1.6
Tonsils & Adenoids	13.9	6.0	2.1	1.0	1.0	3.3	7.0
Fractures	2.6	2.0	2.1	4.0	6.1	3.1	5.2
Benign Tumors	2.2	2.7	3.2	2.8	3.3	2.9	10.1
Hernia	1.6	1.1	2.7	4.3	3.9	2.8	1.7
Cystoscopy	1.5	1.9	3.1	1.6	3.2	2.3	5.2
Sub-Total	87.3	83.8	85.8	82.5	69.8	82.8	75.7
Miscellaneous	12.7	16.2	14.2	17.5	30.2	17.2	24.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
<u>Children</u>							
Tonsils & Adenoids						41	39
Appendectomy						20	6
Fracture						13	13
Skin Surgery						9	28
Sub-Total						83	86
Miscellaneous						17	14
Total						100	100

This report on claims would not be complete without mention of claims not paid. During the year studied 21,000 claims were paid. One thousand one hundred forty-one claims were received that were not paid. Nine hundred twenty-five or 80 per cent of these were considered as not being within the scope of the contract. These included maternity claims within the 10-month waiting period, surgery within three months, medical admission within 30 days, first aid not rendered in a hospital, and admissions for conditions specifically waived by riders. Thirty-one claims were denied because of misrepresentation at the time of the policy, 94 because the illness pre-existed the issuance of the policy, and 91 because the sickness became manifest within the waiting period.

This policy is renewable at the option of the company. With an average of 50,000 policies in force during the year studied and paying 21,000 claims, the right of not renewing was used in 145 instances. Seventy-four policies were not renewed and 71 were renewed only with a waiver. The reasons for nonrenewal are as follows:

1. Material misrepresentation at time of application .....	85%
2. Alcoholism .....	8%
3. Illegal, immoral or questionable conduct .....	6%
4. Attempted suicide .....	1%
	<hr/>
	100%

No cases have been refused renewal because of excessive claim losses or because of the development of serious illness after benefits are in effect. Twenty-nine policies were contested and the premiums returned because of misrepresentation or fraud at the time of application.

During our short period of experience in this field, a few claim problems stand out in importance. They are discussed only briefly.

#### 1. Definition of a hospital.

The policy defines an "accredited" hospital as one that is licensed and supervised as a hospital by the state. If the state does not provide for licensing hospitals, the company

agrees to regard, in lieu thereof, acceptance for registration of the institution as a hospital by the American Medical Association.

In states not providing for licensing of hospitals, registration by the American Medical Association was soon found to be too strict a requirement. As a rule, claims were paid when confinement was in an institution equipped to care for the problem involved.

2. Determining date of manifestation.

The insuring clause of the policy provides for loss against sickness not involving surgery that first *manifests* itself within 30 days of the policy date, and sickness not involving surgery that *manifests* itself within 90 days of the policy date. The word *manifest* was used in an attempt to be more reasonable than the terms, "having its inception", or "having its onset". During the early days of our experience there was considerable discussion regarding the intent of this language. It was not the intent to consider as the date of manifestation the date of first symptom. The first symptoms of an illness can be quite vague and commonplace. It was also not intended to consider a disease as not manifest until a definitive diagnosis has been made. The date of first medical consultation is quite helpful but some sicknesses are unmistakably manifest before medical advice is sought.

3. Hospital expense for the first-aid treatment of injuries.

A provision such as this produces an artificial reason for a person to seek treatment in a hospital when often he could and should be treated in a physician's office or at home. It is difficult to sell this provision without misunderstanding on the part of the public. It should be eliminated, in our opinion.

4. Elective procedures, often of a minor nature, performed while patient is hospitalized for an excluded condition. For example, a person while hospitalized for obstetrical care before the end of the 10-month waiting period has varicose veins injected or a mole removed.

5. Maternity claims on unmarried women.

In closing, I would stress the importance of public relations as it concerns hospital and surgical insurance and the work of the Health Insurance Council. It is only by strict cooperation and the development of mutual trust between insurers on the one hand and hospitals and physicians on the other that the problems of prepayment insurance can be solved. I have spent considerable time meeting with groups representing both parties, and know that there does exist a lukewarm current of hostility in spite of our common mission of making voluntary prepayment work. The Health Insurance Council is setting the pace for the insurance industry. It is incumbent upon us to become familiar with the hospital admission plans, the importance of using uniform claim forms, the problems of the state prepaid surgical plans and the turbulent investigations and legislative hearings probing into the structure, the nature, and the value of voluntary prepayment insurance.

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PRESIDENT BONNETT — Thank you, Dr. Williams. I think that is a significant contribution to our problem.

Now, the cards for your questions have been distributed, and if you have any questions, will you please write them down so that this paper can come up for discussion later on.

Dr. Joseph C. Horan, Associate Medical Director, Metropolitan Life Insurance Company, will present what I believe is unique material in the history of the Association of Life Insurance Medical Directors. Since 1935, Dr. Horan has been medical consultant

to Accident and Health Underwriting and Claims Divisions in the Metropolitan Life, and through his diplomacy and fine Irish wit has been able to identify and solve many of the problems which have arisen in relation to the medical profession and also our medical examiners.

We are all familiar with the reluctance on the part of some members of the medical profession to discuss medical matters with lay persons. The accident and health industry, however, has been largely administered by non-physicians who know the provisions of the contracts which they administer and precisely what information they want from the physician. We got along rather well for a long time until the volume of business increased and our policies, although all having the same basic provisions, became complicated by additional competitive items. These called for different handling, both in underwriting and in claim work, as though between two companies. It was then that doctors began to object to "interference" by non-medical personnel. I believe, however, that the vast majority of the practicing physicians are beginning to realize that medical care and medical service is not entirely the responsibility of the physician, but in the future it must be shared between the practitioner, the layman, and the hospital administrator.

The medical profession does not fully appreciate the differences in types of policies and would prefer to have all of the benefits in all of the policies, as well as the forms, identical. As a matter of fact, it was the demand by physicians for identical forms which led us to recognize that we had a real problem in our relations with the practicing physician. Our forms and policy provisions are complex and we should try to simplify them. In the Metropolitan Dr. Horan has done yeoman's work by the elimination of certain objectionable practices and suggesting different methods of handling potential misunderstandings. It is a pleasure to introduce Dr. Horan.



## MORBIDITY EXPERIENCE UNDER PERSONAL ACCIDENT AND HEALTH INSURANCE

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During the last five years, more than fifty life insurance companies have entered the accident and health business for the first time. Of these more than fifty companies, two-thirds of them are life insurance companies who belong to this Medical Directors Association. In the previous 61 meetings of this group, the subject of accident and health insurance did not concern us enough to ever devote a part of the Annual Meeting to the subject, as we are doing today. There are 206 companies in the Medical Directors Association, and, as far as we have been able to ascertain, 93 of them do an accident and health business, either individual or group or both. This is 45 per cent of the total Association company members. It may well be that more than half of all our companies in this Association will be in the business before we have another Annual Meeting.

Accident and health insurance is now big business, as nearly three billion dollars of annual premium in the aggregate is being paid by the people of this country for some kind of voluntary health protection either through Blue Cross and Blue Shield or through insurance companies. Only four giant corporations have sales exceeding this aggregate amount, and they are the American Telephone and Telegraph Company, Standard Oil Company (New Jersey), General Motors Corporation, and the United States Steel Corporation. The annual premium income has increased 24 per cent during the year 1952 for this type of coverage, and it now stands at a grand total of nearly \$2,860,000,000. The insurance companies' share of this total premium income is nearly \$1,920,000,000 and that imposing amount is being paid as either group or individual accident and health premiums to the life insurance companies and the casualty insurance companies of America. This is more premium than the people of this country

paid for all of their fire insurance during the same year. Of the nearly two billion dollars of annual premium paid last year to insurance companies, individual accident and health protection accounts for almost 45 per cent of the total. It will not be very long before this premium for individual accident and health insurance will reach a billion dollars a year.

This spectacular growth of voluntary health protection in the United States in recent years is unique in insurance history. Before Pearl Harbor, the aggregate annual premium paid for this type of coverage was about \$300,000,000. In 1944 this had more than doubled and by 1948 the aggregate annual premium had quadrupled. At the end of 1952, it stood at more than nine times the amount which was being paid out just twelve years ago.

This phenomenal growth has been contributed to by Blue Cross and Blue Shield acceptance across the nation and the increase in the number of people protected by these service plans has been very noteworthy. We in the insurance business may be forgiven, however, if we raised an eyebrow when we heard the advocates of these service plans boast of more than 90,000,000 people having hospitalization coverage, and 73,000,000 being protected by surgical operation coverage, and 35,000,000 having medical expense insurance in the Blue Cross, Blue Shield, and, almost as an afterthought, the insurance companies. These insurance companies, life and casualty, have in force more than half of all the hospitalization, and more than 60 per cent of all the surgical operation coverage, and almost 50 per cent of the medical expense coverage.

Long before hospitalization, surgical operation, medical expense, or catastrophic protection became so popular, the first and oldest form of voluntary health insurance, namely, protection against the loss of income due to disability, was a well-established and thriving business. It is estimated that as of the end of last year, 60 out of every 100 workers had insured themselves against the loss of their earning capacity by individual or group accident and health protection. The insured working population thus protected now numbers about 38,000,000. This type of insurance is underwritten on 75 per cent of that total by casualty and life insurance companies. This weekly indemnity or cash sickness benefit gives off the job protection covering loss of income because of illness or non-

occupational accident. Group accident and health covers nearly 18,000,000 of the insured workers, and individual accident and health insurance covers nearly 13,000,000 more of them. Claims paid by insurance companies for loss of income in 1952 were estimated at nearly five hundred million dollars.

It has been said that life insurance is an attempt to underwrite the loss of family income when it is permanently cut off by the death of the wage earner, or when it ceases by reason of retirement; so also weekly indemnity accident and health insurance is a method of replacing that same income when earning capacity is temporarily lost because of disability due to injury or disease. Life insurance executives, your own included, have been thinking about this complementary coverage to help complete a ring of protection for individual policyholders by making this new line available through the one agent or broker. This rounding out of a ring of protection by adding accident and health coverage to the life insurance actually gives the individual insurance buyer the equivalent of the packaged program available to members of employed groups. The self-employed, the professional man, members of partnerships, and many others who are not wage earners or on a salary, can buy this programmed combination of life and accident and health insurance through the one agent or broker and underwritten by a single insurance company. The programmed combination would include life insurance and retirement income through the life policy and also protection against loss of income due to temporary disability, and meet in whole or in part the costs of hospitalization and surgical operation and medical care, not only for himself but for his dependents, and also maternity benefits for his wife, and even catastrophic coverage for himself and the family in the individual accident and health coverage. In the absence of statutory restrictions, all of these multiple coverages could be tied up neatly together in one policy just the same as the most extensive coverage in a group certificate.

How does this new evolutionary thing in insurance underwriting affect the Medical Director whose company has come lately into this phase of the business? The underwriting of personal accident and health insurance and the medical selection of applicants for this type of coverage is somewhat of a specialty within the specialty

of medical selection. The Medical Director who is a newcomer taking up this type of underwriting for the first time will find many differences between the two types which are not at first apparent. Both life insurance medical selection and accident and health insurance selection are exercises in prognosis. The recently arriving Medical Director will learn that there are many individuals who are perfectly good life insurance risks to whom they cannot issue any type of health insurance whatsoever.

Detailed description of the accident and health coverage will not be given at this time because they will be fully covered later in the panel discussion, but they, of course, play an important part in the exercise of medical selective techniques.

For purposes of orientation, it might be illuminating to list the more important medical reasons for rating or decline as they occur in the life insurance underwriting and then compare these with the principal reasons for outright decline or the use of an exclusion endorsement in the underwriting of applicants for personal accident and health coverage.

An analysis was made of 110,000 cases not issued as applied for in the Metropolitan Life Insurance Company, Ordinary Department; 58,000 of these cases were not issued as applied for because of medical reasons. The number declined because of medical reasons was 21,000 and the number rated sub-standard was 37,000.

The medical impairments, in the order of their numerical importance, resulting in a decline in the analysis, are as follows in the 21,000 declined cases:

High blood pressure .....	6,000
Heart murmurs .....	2,000
Overweight .....	2,000
Diabetes .....	1,000
Glycosuria .....	1,000
Ulcers .....	1,000
Cardiac hypertrophy, without murmur	900
Pyuria .....	500
Epilepsy .....	400
Pulmonary tuberculosis .....	400
Abnormal pulse rate .....	400

and because of psychoneurosis, renal calculus, and history of asthma, 300 each. All other medical reasons resulted in 4,500 declinations.

We then had analyzed 1,000 physically declined accident and health applicants for the year 1952. Listing some of the impairments which necessitated the most frequent decline action by percentages, we have among the more prominent types of impairment the following: neurasthenia, psychasthenia, or psychoneurosis, 10 per cent of the total rejected; diseases of the spine, including herniated discs, nearly 9 per cent; histories of peptic ulcer and other digestive disorders, 6 per cent; histories of rheumatism or arthritis, nearly 5 per cent; bone or joint diseases and amputations, 4 per cent; histories of cerebral concussions, fractured skulls, or diseases of the brain,  $3\frac{1}{2}$  per cent; and impaired vision or detached retina,  $2\frac{1}{2}$  per cent.

The reasons these rank high among the causes for declining accident and health weekly indemnity are because they are conditions which may recur and cause incapacitation, or because they may disable the applicant for a very long time. The Medical Director newly arrived in the accident and health business will realize that in life underwriting some of these causes for declining in accident and health insurance would not rank very high in the declinations for life insurance. Many of these same causes which necessitated a declination for health insurance because of these causes might even necessitate a rejection for accident insurance.

Now, of course, there is a common area where the reasons for declining an accident and health applicant for health insurance would also be the cogent reason for declination for life insurance. These would be the circulatory diseases, including hypertension, extreme overweight, the genito-urinary impairments, and tuberculosis and diabetes.

We will now compare the underwriting results in the cases which were rated up for life insurance with the accident and health applicants where it was necessary to utilize an exclusion endorsement. As in the declined cases, the purpose of this comparison is not so much to show whether the underwriting techniques are

similar or identical, because the life insurance applicants and the accident and health insurance applicants are not strictly comparable statistically. It is valid to recite the underwriting results, however, to emphasize the differences in the medical selection between the two groups. It was necessary to issue substandard in a total of 37,000 of the life applicants studied because of medical reasons. Here again we find the reasons for rating substandard are the familiar ones which list as follows:

Overweight .....	13,000
High blood pressure .....	6,000
Heart murmurs .....	3,000
Ulcers .....	3,000
Psychoneurosis .....	700
Renal calculus .....	700
Asthma .....	700
Pyuria .....	500
Indigestion .....	500

and the other familiar causes, such as cardiac hypertrophy, epilepsy, tuberculosis, and abnormal pulse rate, 100 out of the 37,000, and there were 8,500 other cases rated up because of medical reasons.

Now, if we look at a sample of health policies issued with exclusion endorsements, we find the following impairments which, when they are pre-existent, necessitate an exclusion for any subsequent loss to the applicant: hernias — present, potential, or even recently operated — comprise 24 per cent of all the cases in which exclusion endorsements were used; histories of intervertebral discs, 15 per cent; visual impairments and other eye disorders, 14 per cent; bone and joint disorders, 12 per cent; varicose veins, 9 per cent; hemorrhoids, 6 per cent; histories of urinary stones,  $3\frac{1}{2}$  per cent; diseases of the nose, such as deviated septa or polyps, 3 per cent; skin diseases, 3 per cent; other genito-urinary disorders,  $1\frac{1}{2}$  per cent; anal fissures,  $1\frac{1}{4}$  per cent; hay fever and other allergies, 1 per cent. In this group of cases, those impairments that are common to both life and accident and health applicants, which were prevalent when we were studying only declined cases, did not appear at all because exclusion riders were not used for circulatory disorders or hypertension or diabetes or tuberculosis or overweight.

Here again we see that the impairments necessitating the use of exclusion riders would not seriously affect the underwriting of the same applicant on a concurrent life application, but they are of importance when we are considering the issuance of accident and health coverage.

Now let us look at a claim experience for sickness claims under the weekly indemnity provision of the accident and health contract. We took off 10,000 sickness claims occurring in some part of 1952 and pulled out for study every tenth claim. These were all males. Disabilities of 8 days or less were excluded. The percentage of the cases of disability by cause in this study gave us a morbidity in a descending order as follows: sicknesses classified as influenza and gripe, pneumonia, virus, and other respiratory diseases constituted 40 per cent of all the claims paid. Ulcers of the stomach, or duodenum, appendicitis, diarrhea, and enteritis, accounted for 12 per cent of all the claims paid. Diseases of the bones and organs of locomotion, arthritis, and rheumatism represented 5.6 per cent. Diseases of the genito-urinary system, comprised 4.8 per cent. Hernias of the abdominal cavity accounted for 4 per cent; diseases of the arteries and veins (mostly varicose veins), 3.7 per cent; rheumatic fever and heart disease, all forms, 3.6 per cent; other diseases of the central nervous system, nerves and peripheral ganglions, 2.5 per cent; neoplasms, benign or unspecified, 2.4 per cent; disease of the skin and cellular tissue, 2.4 per cent; acute tonsillitis, hypertrophy of the tonsils and adenoids, 2.3 per cent; all other diseases specified as infective or parasitic, 2.1 per cent; psychosis and psychoneurosis, 1.9 per cent; malignant neoplasms, 1.9 per cent; disease of the gall bladder and bile ducts, 1.2 per cent; and diseases of the ear and mastoid, 1.1 per cent. All other causes of disability produced 1 per cent or less of the claims. They included allergies, hypertensive disease, diseases of the eye, anemias, apoplexy, diabetes, thyroid disease, and other miscellaneous causes.

If we break down these causes of disability into the age groups where they occur, we find that age 40 to 49 produced 38 per cent of the claims. In the age distribution of all policies in force, 35 per cent fall into this same age classification. In the age group 30 to 39, we had 32 per cent of all the claims and 34 per cent of the

policyholders are in that age group. Twenty-one per cent of the claims occurred in the oldest age, 50 to 59 group, and it constitutes 16 per cent of the total number insured, and 9 per cent of the claims arose in the youngest age, 20 to 29 group, which represents 15 per cent in the age distribution study of the total in force.

Types of illness which result in long disabilities can be measured by the mean duration in days. Prolonged disability is an important factor in the claim loss ratios. There are five types of illness which give us very long durations in the mean number of days of incapacitation as brought out by this study. These causes of long disability are: pulmonary tuberculosis, with the total of the full 52 weeks of coverage being paid out; vascular lesions affecting the central nervous system, which had a mean average duration of about 275 days; rheumatic fever and heart disease, all forms, 118 mean average duration; hypertensive disease, 99 days; malignant neoplasms, 96 days. These five types of illness, resulting in long disability claims, occurred in only  $5\frac{1}{2}$  per cent of all the claims in this study, but when they do occur they result in high claim costs.

Those Medical Directors whose experience in morbidity has been confined solely to types of illness as measured by total and permanent disability annuity, or waiver of premium benefits, are familiar with these same illnesses of long duration as exemplified by the five principal causes occurring in total and permanent disability cases. Whether the waiting period is 90 days or 120 days, these five diseases bulk large in the types of illness resulting in total and permanent claims. Now this same Medical Director recently coming into the personal accident and health field will have to be concerned with those causes of disability with which he is familiar in only five per cent of his total sickness claims and the other 95 per cent of the types of illness causing shorter disabilities will, for the most part, be new to him as reasons for making a claim. In this study of the sickness claims in our Company, the mean duration in days of disability by type of illness gives us a spread of mean number of days of claim payment for influenza and grippe of 14 up to pulmonary tuberculosis of 365 mean days. The average duration of the disability claims from all causes of illness in this study is exactly 35 days or 5 weeks. The types of illness ranging upward from 35 days to 365, in addition to the five



types of illness already mentioned, namely, tuberculosis, apoplexy, heart disease, hypertension, and malignancies, includes seven other classifications resulting in long mean duration averaging more than 6 weeks' duration. These are: diseases of the ear and mastoid process, 71 8/10 days; other diseases of the nervous system, 62.7 days; ulcers and non-cancerous diseases of stomach and duodenum, 56 days; psychoses and psychoneurotic disorders, 55 days; hernia of the abdominal cavity, 55 days; diseases of the bones and organs of locomotion, 44 days; and diseases of the arteries and veins, 42 days.

These 12 types of illness that result in durations in excess of the average claim duration in the study are not too prominent in the total per cent list of causes, because altogether they add up to only one-fourth of all the claims paid. For two reasons, however, they present a challenging territory for the exercise of careful medical selections at the time of underwriting. They constitute the claims of the longer durations with the subsequent prolonged claim costs, and they are diseases which are most likely to be pre-existent in a given group of applicants who may be attempting to practice selection against the company because of prior disability due to these very same causes.

Certainly one will want to carefully investigate any suspicion of previous tuberculosis, apoplexy, heart disease, hypertension, or malignancy. Where there is reason to suspect that there may have been previous illness due to mastoid or infected ears, nervous system diseases, stomach or duodenal ulcers, psychoses, hernias, diseases of the organs of locomotion, or varicose veins, one will want to utilize the tools now available for getting the facts concerning these pre-existent conditions. Requests for statements from attending physicians or hospitals, procured, of course, with authorizations from the applicant himself will give the facts upon which to make an appropriate evaluation of the risk. Oftentimes these statements may result in the issuance of the coverage and are thus to the advantage of the applicant in many cases. Examinations by the company's own medical examiners may also give the information needed for the exercise of proper medical selection.

Of course it is not implied here that only those types of illness which produce longer disabilities should be investigated at the time

of the underwriting. Types of disease causing shorter disabilities are also amenable to the same type of handling, and diseases of the eye, arthritis and rheumatism, histories of appendicitis, benign neoplasms, skin diseases, diabetes, allergies, genito-urinary system diseases, thyroid disorders, chronic tonsillitis, or attacks of repeated tonsil inflammation, the anemias, and the diarrheas and enteritis should all be investigated at the time the application is being underwritten.

Pursuing our investigation of morbidity, we next took off incidence rates, that is, the number of claims per 10,000 insured by age and type of illness in the sample which we were studying. In those policies paying benefits from the first day of sickness, the incidence rate for sickness disabilities is 2,462 per 10,000 exposed. In those policies with waiting periods of seven days, obviously we will have a lower incidence rate of claim. These total 936 per 10,000 insured on an annual basis. The highest incidence of claims lasting 8 days or longer occurs in the respiratory disease group. The classification of all other respiratory diseases gave us an incidence rate of 167 claims per 10,000; influenza and grippe, 165 claims; pneumonia, 105; and virus infection, unspecified, 65; diseases of the genito-urinary system, 59.5. Hernias incapacitated 51 per 10,000 exposed; ulcers of the stomach and duodenum, 50; diseases of the arteries and veins, 46; rheumatic fever and heart disease, all forms, 44 claims per 10,000. A like number of claims were made because of diseases of the bones and organs of locomotion. Other digestive tract diseases resulted in 42 claims per 10,000. Appendicitis gave us 40 claims per 10,000, and other diseases of the central nervous system, nerves and peripheral ganglions, 31. Benign neoplasms gave us 30 cases of disability per 10,000 insured, and skin diseases the same number. Tonsillitis accounted for 28.6 claims per 10,000; all other diseases specified as infective or parasitic, 26; arthritis and rheumatism, 25; psychosis, 23; neoplasms, 18; diarrhea and enteritis, 18; diseases of the gall bladder and bile ducts, 15; ear and mastoid, 13; and 12 adults per 10,000 insured were disabled because of diseases common to childhood, such as measles, chickenpox, and mumps. Allergies produced 10 claims per 10,000, and hypertensive disease only 8; diseases of the eyes, 7; pulmonary tuberculosis only 3.6 claims per 10,000; a like number of the anemias, and the same number

for the vascular lesions affecting the central nervous system. Diabetes gave us 2.5 claims per 10,000; thyroid disease gave us one claim per 10,000.

This morbidity study concerning which we have been talking, and the figures which are included in the tables that have been distributed to you, do not encompass a large number of claims and as an actuarial study it is really a small sampling. It is not presented to you for any actuarial purposes but is utilized here primarily to give you some indication of the types of illness with their percentage distributions and durations, so that you, as medical men, can derive some conclusions helpful to you in your underwriting of personal accident and health applicants.

The Medical Director whose advice is expected and sought on the underwriting of applicants for personal accident and health insurance will see mostly those cases which are, in the lay underwriter's evaluation, classified up to that point in the transaction, as substandard. This is because of adverse past medical history or the presence of a physical impairment. Re-evaluation of either or both of these factors by the Medical Director, with his more able professional skills, may reinstate the applicant into a standard classification, and the coverage may be issued as applied for. Because of paucity of factual medical data, the Medical Director may conduct or direct further medical investigation either through request for statements from the attending physicians or hospitals or by examination by his own company examiners, and with these further facts thus available he can practice his professional science and art in prognosis on the given case.

If his opinion is that the risk may not be standard because of the medical findings, he may decline or postpone or issue with an exclusion endorsement. Such an endorsement excludes payment of a benefit for any loss otherwise covered in the policy because of the presence of a known impairment or the recurrence of a pre-existent disease or disorder which is named in the rider. Thus the policy is rated up because of the substandard classification by mutual agreement and it covers all losses except one, or at most two, which are named in the exclusion endorsement. If the impairment be based on adverse past medical history, the use of an exclusion endorsement merely makes specific the contract provision which

excludes any pre-existent disease and payment for loss due to the same. These endorsements may also be looked at as a method of including a co-insurance factor assumed by the applicant himself for the particular loss because of the extra hazard which places him in a substandard classification. The substandard applicant can thus achieve a great deal of protective coverage on all the future hazards but one or two by which he may be temporarily deprived of his earning power by reason of injury or disease.

With this understanding of the philosophy underlying the use of exclusion endorsements, the Medical Director will find himself dealing frequently with cases requiring such endorsements in many of the applications which are referred to him. The common pitfalls in the utilization of exclusion endorsements are fairly obvious — too much protection should not be taken away by the endorsement or the applicant will be offered a policy which in last analysis is not suited to his needs. You should not, for instance, offer an endorsement excluding any loss due to disease of the cardiovascular system. The converse of this is equally true. The rider must not be so limited as to be meaningless. You should not rider only one accessory nasal sinus. Good medical judgment is required in deciding what types of cases are salvageable by the proper use of exclusion endorsements, and the Company must be protected by proper wording of the riders so that they will exclude from coverage impairments and their attendant future losses, which at the time of the issuance of the insurance both parties intended to leave uninsured. When properly utilized and there is a mutual understanding concerning the limitations which they impose, they are a very useful device for taking care of people who would otherwise be uninsurable, particularly for health insurance, and to a lesser extent, for hospitalization and surgical benefits, or even accident insurance only.

In our own Company we have used exclusion endorsements from the very beginning. At first they were applied to only a few cases, such as hernias, hemorrhoids, varicose veins, eye impairments, and histories of urinary stones. In the more recent years we have used endorsements much more liberally and have utilized them to cover adverse past medical history of infectious hepatitis, and biliary tract involvement, including gall bladder and gall stones, diseases of the

stomach and duodenum, and, in appropriate cases, even intervertebral discs successfully operated on or those not severe enough to require operations, amebic and bacillary dysentery, and post-operative cases of prostate and thyroid disease; also renal glycosuria, internal derangements of the knees, low back conditions, diseases of the skin, allergies, and anemia, diseases of the rectum and anus, and specific parts of the urinary tract and genital tract.

It may be worth noting here that the last word has not yet been heard concerning the proper technique for the underwriting of substandard accident and health risks. Nearly all of the companies in this business utilize the exclusion endorsement for known adverse past medical histories or impairments which have a pertinence in the underwriting of these substandard applicants. There are a few companies in the accident and health field who attempt to utilize the more familiar method of rating used in life insurance, namely, an additional premium based on the occupational classification or a marking up of the age to throw the applicants into a higher premium-paying group. The utilization of the exclusion endorsement is not a completely satisfactory answer to the problem. Certainly, from the applicant's viewpoint he would rather pay a higher premium and be entitled to benefit when he becomes sick and disabled with the condition which is most likely to incapacitate him at some time in the future. From the viewpoint of the agent or broker, placement becomes difficult when the policy is issued with an exclusion endorsement. From the viewpoint of the company's own Claim Division, no matter how carefully the exclusion endorsement is worded, there may be some controversy in questions raised at the time a claim does arise. For all these reasons, perhaps our actuaries should study the question of how we can insure more people for accident and health insurance, which they need and want, by building a substandard table of rated up premiums applicable to impaired risks, based on more extensive studies of morbidity.

Another important function of the Medical Director whose company enters the personal accident and health field stems from his particular capacity to act as medical advisor on claims. In some cases where the submitted proofs of claim are essentially medical or surgical, only the Medical Director, with his physician's training and his highly specialized insurance know-how, can unscramble

the omelet of apparently conflicting medical facts. Just as some reorientation in the underwriting approach is necessary, so also must the Medical Director acquire some new road maps to guide him through this different kind of accident and health claim administration. When acting as consultant to the Claim Division on a life insurance policy, the medical questions which may arise at the time of a claim are fairly simple. When a policyholder is dead, he is dead. Facts as to the loss can be established and there is only one claim which is the first and last one. The events insured against in an accident and health policy are multiple and may happen many times or in multiplicity at the one time, and the proofs of the loss claimed may not be so evident. The claimant is at the same time both the insured and the beneficiary and it may be advantageous to him as a beneficiary to make the insuring company believe the claimed losses which have been incurred by the insured come within the policy contract. An attempt to take advantage of the company and to attain payment on an invalid claim may be deliberately fraudulent, and this does occur in a small percentage of the claims.

Because the claimant is a layman and is quite unfamiliar with the natural history of disease, he may innocently make a claim for losses that is really attributable to pre-existent disease and not covered by the contract terms, and here the benefit of the advice of the Medical Director is essential to the accident and health Claim Division in properly evaluating such a claim. In sickness claims particularly there is a difference in the relationship of the insured to the event insured against which does not exist in any other type of insurance. In a fire insurance claim the company's investigators have the burned framework or the evidences of total destruction of a building. In automobile collision insurance there is at least a photograph of the damaged cars and the police diagrams of the accident. Like examples are obvious for all the other kinds of insurance. In a sickness claim you may have only the statement from the insured, who is also the beneficiary, that he has a terrible pain in his head, or over the precordium, or he may point his finger to the epigastric area. He says that the event insured against has occurred and that this subjective symptom is his proof of loss. Even in personal accident insurance we have some visible evidence of the injuries traumatically sustained. In the hospitalization or

surgical benefit or maternity or the catastrophic coverages, there are objective evidences of the loss having occurred. In a sickness claim, where there are no objective physical findings which would serve to substantiate the chief complaints, even the attending physician's statement is based on what the patient tells him. Certainly we cannot expect a layman in the claim approvers group to know whether the statements of purely subjective symptoms are consistent or medically plausible. It is not to be inferred that claims made for symptoms alone are not perfectly legitimate claims which should be paid and, of course, all companies do pay claims of this type every day, but in the quick claim soon after issue or in the claim which may raise the suspicion of pre-existent disease, or in the claim where the length of disability is not proportional to the average expected loss for that disease, the Medical Director can be of great help in the final decision concerning the medical factors entering into the claim payment.

All claim administration in the accident and health field requires speedy decisions so that there may be prompt claim payments. That is the finished product of the entire transaction and is the commodity which the policyholder believes he has purchased. So the Medical Director must remember that protracted medical investigations at the time of claim, or any attempt at reunderwriting the case when it comes into the Claim Division, is not acceptable practice. He must remember, too, that his claim men are not medical students and in so far as is possible they need unequivocal answers to their medical questions. "Yes or No" is always preferable to "Maybe".

The measure of incapacitation and the cause for it is not merely a matter of medico-actuarial morbidity tables, nor is it even solely a correlation of insurance practices with clinical syndromes and "gadget" diagnoses and the shrewd guessing which we call prognoses. Every claim presented has some degree of overlay of individual psychology, personal ethics, earned income, and national prosperity. It is probably true that insured sicknesses may have a somewhat longer duration than uninsured sicknesses. Other economic factors that impinge on a sickness claim in these days of high income taxes is the fact that benefits paid are tax exempt. Old-time accident and health men will say that one of the surest

ways to get sick is for a person to have accident and health insurance when they lose their job or are slated for retirement. All of this sums up to the existence of an impairment not mentioned in our morbidity classifications and one which is not described in any of our medical textbooks. This great boggy man of accident and health insurance is moral hazard. It may be present in some degree both in the application and in the prosecution claim. This impairment might be described as an acute or chronic fibrosis of the individual's conscience. It varies in different people from practically zero up to one hundred per cent. If we knew how to rate it at the time of the application, even that would not be protective enough because at the time of a claim we frequently are dealing with an almost different individual when the stakes are high enough and when circumstances change. Trying to allow for this impairment, which operates on a sliding scale, is as elusive as trying to pick up quicksilver with an oyster fork.

In life underwriting we know from our mortality studies about how many will die and with what age distribution when the event insured against is likely to become a reality. We, furthermore, know precisely what the amount at risk is when we are underwriting. It is unimportant, however, to know who the policyholder is whose contract will terminate in a claim presentation. In accident and health insurance, because of the moral hazard which may undergo an acute exacerbation at the time a claim occurs, we do not know how many will claim sickness or for how long that sickness will be protracted. We do not know either how often the same individual will become a repetitive claimant, and we do not know what the amount at risk may finally be, except, of course, the ultimates of the contract restrictions. The morbidity experience which we have looked at today may be subject to marked fluctuations in the future and it would be more important to know who would become a claimant because if we have too many policyholders with high moral hazard on the books, our loss ratios will go up with jet propelled speed. So, this intangible impairment must be kept in mind when dealing with claims and, in a small percentage of the claimants, can never be lost sight of by the claim men and their medical advisor until we reach that millennium when a standard provision is included in all policies which will



read, "This policy does not cover any loss due to the morbidly fibrosed and calcified conscience of the claimant."

Fortunately for the business, the vast majority of policyholders and claimants are basically honest and the fibers of their conscience are in good and healthy tone and free from any morbid pathology. For the most part the claims are completely bona fide and should be honored and paid promptly without question. This business could not actually be conducted long if there were not mutual

Table A

Number and Percent of Cases\* of Disability in Sample of Personal Accident and Health Claims Paid in 1952 by Cause of Disability and Age

CAUSE OF DISABILITY	NUMBER					PERCENT				
	All Ages	20-29	30-39	40-49	50-59	All Ages	20-29	30-39	40-49	50-59
1. All other respiratory diseases	141	10	51	49	31	13.5	10.5	15.4	12.3	14.4
2. Influenza, gripe	139	13	39	61	26	13.3	13.7	10.8	15.3	12.1
3. Pneumonia	88	8	28	31	21	8.4	8.4	8.4	7.8	9.8
4. Virus infection, unspecified	55	7	19	18	11	5.3	7.4	5.7	4.5	5.1
5. Diseases of the genito-urinary system	50	4	15	17	14	4.8	4.2	4.5	4.3	6.5
6. Hernia of the abdominal cavity	43	2	19	11	11	4.1	2.1	5.7	2.8	5.1
7. Ulcers and non-cancerous diseases of the stomach and duodenum	42	3	12	19	8	4.0	3.2	3.6	4.8	3.7
8. Diseases of the arteries and veins	39	12	23	4	39	3.7	-	3.6	5.8	1.8
9. Diseases of the bones and organs of movement, except arthritis and rheumatism	37	4	8	15	10	3.6	4.2	2.4	3.8	4.7
10. Rheumatic fever and heart disease, all forms	37	0	4	18	15	3.6	-	1.2	4.5	7.0
11. Other diseases of the digestive system	35	2	12	17	4	3.4	2.1	3.6	4.3	1.8
12. Appendicitis	34	7	12	10	5	3.3	7.4	3.6	2.5	2.3
13. Other diseases of the central nervous system, nerves, and peripheral ganglia	26	1	7	13	5	2.5	1.0	2.1	3.3	2.3
14. Neoplasms, benign and unspecified	25	6	7	11	1	2.4	6.3	2.1	2.8	0.5
15. Diseases of skin and cellular tissue	25	4	8	9	4	2.4	4.2	2.4	2.3	1.8
16. Acute tonsillitis, hypertrophy of tonsils and/or adenoids	24	5	10	9	0	2.3	5.3	3.0	2.3	-
17. All other diseases specified as infective and/or parasitic	22	2	9	6	5	2.1	2.1	2.7	1.5	2.3
18. Arthritis and rheumatism	21	1	10	8	2	2.0	1.0	3.0	2.0	0.9
19. Psychoses and psychoneurotic disorders	20	4	4	8	4	1.9	4.2	1.2	2.0	1.8
20. Malignant neoplasms	15	1	1	5	8	1.4	1.0	0.3	1.3	3.7
21. Diarrhea and enteritis	15	1	10	2	2	1.4	1.0	3.0	0.5	0.9
22. Diseases resulting from injury or trauma	15	3	5	6	1	1.4	3.2	1.5	1.5	0.5
23. All other diseases	14	1	5	4	4	1.3	1.0	1.5	1.0	1.8
24. Diseases of gall bladder and bile ducts	13	1	2	7	3	1.2	1.0	0.6	1.8	1.4
25. Diseases of ear and mastoid process	11	3	3	3	2	1.1	3.2	0.9	0.8	0.9
26. Ill-defined diseases	11	0	6	3	2	1.1	-	1.8	0.6	0.9
27. Common diseases of childhood (measles, chickenpox, mumps)	10	1	5	4	0	1.0	1.0	1.5	1.0	-
28. Allergic disorders	10	1	2	4	3	1.0	1.0	0.6	1.0	1.4
29. Hypertensive disease	7	0	1	4	2	0.7	-	0.3	1.0	0.9
30. Inflammatory and other diseases of the eye	6	0	3	1	2	0.6	-	0.9	0.3	0.9
31. Anaemias	3	0	1	1	1	0.3	-	0.3	0.3	0.5
32. Pulmonary tuberculosis	3	0	1	1	1	0.3	-	0.3	0.3	0.5
33. Vascular lesions affecting central nervous system	3	0	1	1	1	0.3	-	0.3	0.3	0.5
34. Diabetes mellitus	2	0	0	1	1	0.2	-	-	0.3	0.5
35. Diseases of the thyroid gland	1	0	0	0	1	0.1	-	-	-	0.5
All Causes	1,042	95	332	400	215	100.0	100.0	100.0	100.0	100.0

\* Includes only illnesses lasting eight days or more

honesty on the part of the claimants and the insuring companies. That this is true is strikingly demonstrated by the stupendous and very rapid growth of the personal accident and health business.

Table B

Incidence Rates\* (Number of Claims per 10,000 Insured) By Age and Type of Illness as Taken from 10% Sample of Personal Accident and Health Claims Received During 1952

TYPE OF ILLNESS	AGE GROUP				
	All Ages	20-29	30-39	40-49	50-59
1. All other respiratory diseases	167.8	79.0	180.1	166.5	227.6
2. Influenza, grippé	165.5	102.7	137.8	207.3	190.9
3. Pneumonia	104.7	63.2	98.9	105.4	154.2
4. Virus infection, unspecified	65.5	55.3	67.1	61.2	80.8
5. Diseases of the genito-urinary system	59.5	31.6	53.0	57.8	102.8
6. Hernia of the abdominal cavity	51.2	15.8	67.1	37.4	80.8
7. Ulcers and non-cancerous diseases of stomach and duodenum	50.0	23.7	42.4	64.6	58.7
8. Diseases of arteries and veins	46.4	-	42.4	78.2	29.4
9. Rheumatic fever and heart disease, all forms	44.0	-	14.1	61.2	110.1
10. Diseases of bones and organs of movement, except arthritis and rheumatism	44.0	31.6	28.3	51.0	73.4
11. Other diseases of the digestive system	41.7	15.8	42.4	57.8	29.4
12. Appendicitis	40.5	55.3	42.4	34.0	36.7
13. Other diseases of the central nervous system, nerves and peripheral ganglia	30.9	7.9	24.7	44.2	36.7
14. Neoplasms, benign and unspecified	29.8	47.4	24.7	37.4	7.3
15. Diseases of the skin and cellular tissue	29.8	31.6	28.3	30.6	29.4
16. Acute tonsillitis, hypertrophy of tonsils and/or adenoids	28.6	39.5	35.3	30.6	-
17. All other diseases specified as infective and/or parasitic	26.2	15.8	31.8	20.4	36.7
18. Arthritis and rheumatism	25.0	7.9	35.3	27.2	14.7
19. Psychoses and psychoneurotic disorders	23.8	31.6	14.1	27.2	29.4
20. Malignant neoplasms	17.9	7.9	3.5	17.0	58.7
21. Diarrhea and enteritis	17.9	7.9	35.3	6.8	14.7
22. Diseases resulting from injury or trauma	17.9	23.7	17.7	20.4	7.3
23. All other diseases	16.7	7.9	17.7	13.6	29.4
24. Diseases of gall bladder and bile ducts	15.5	7.9	7.1	23.8	22.0
25. Diseases of the ear and mastoid process	13.1	23.7	10.6	10.2	14.7
26. Ill-defined diseases	13.1	-	21.2	10.2	14.7
27. Common diseases of childhood (measles, chickenpox, mumps)	11.9	7.9	17.7	13.6	-
28. Allergic disorders	11.9	7.9	7.1	13.6	22.0
29. Hypertensive disease	8.3	-	3.5	13.6	14.7
30. Inflammatory and other diseases of the eye	7.1	-	10.6	3.4	14.7
31. Pulmonary tuberculosis	3.6	-	3.5	3.4	7.3
32. Anaemias	3.6	-	3.5	3.4	7.3
33. Vascular lesions affecting central nervous system	3.6	-	3.5	3.4	7.3
34. Diabetes mellitus	2.4	-	-	3.4	7.3
35. Diseases of the thyroid gland	1.2	-	-	-	7.3
All Causes	1240.3	750.6	1172.7	1359.5	1578.6
Based on given number of claims	1042	95	332	400	215

\* Includes only illnesses lasting eight days or more

N.B. All incidence rates involving ten or more claims are underscored

Incidence Rate, Comprehensive: 2,461.9 per 10,000

Incidence Rate, Simplex : 936.4 per 10,000

Table C

Mean Duration of Disability Claims by Type of Illness

10 Percent Sample of 1952 Health Claims

Submitted on Personal A and H Policies (Metropolitan Life Insurance Company)

TYPE OF ILLNESS	AVERAGE DURATION OF CLAIM (DAYS)		
	Total **	Comprehensive **	Simplex
1. Pulmonary tuberculosis	364.0*	364.0*	364.0*
2. Vascular lesions affecting central nervous system	274.7*	384.0*	56.0*
3. Rheumatic fever and heart disease, all forms	118.5	125.5	111.8
4. Hypertensive disease	99.1*	113.3*	14.0*
5. Malignant neoplasms	96.0	49.5*	127.7*
6. Diseases of the ear and mastoid process	71.8	78.8*	64.8*
7. Other diseases of the central nervous system, nerves and peripheral ganglia	62.7	61.5	63.7
8. Ulcers and non-cancerous diseases of the stomach and duodenum	56.4	43.8	66.0
9. Psychoses and psychoneurotic disorders	55.5	52.9	58.1
10. Hernia of the abdominal cavity	55.4	57.1	54.3
11. Diseases of the bones and organs of movement, except arthritis and rheumatism	44.6	35.7	50.6
12. Diseases of arteries and veins	42.2	52.2	34.0
13. Diseases of gall bladder and bile ducts	41.2	50.4	34.3*
14. Diseases resulting from injury or trauma	40.4	8.3*	47.8
15. All other diseases	39.4	38.4*	40.0
16. Ill-defined diseases	36.9	29.8*	40.4*
17. Inflammatory and other diseases of the eye	36.7*	27.0*	46.3*
18. Arthritis and rheumatism	31.0	12.1*	39.8
19. All other diseases specified as infective and/or parasitic	30.5	36.8	25.2
20. Appendicitis	29.5	30.0	29.2
21. Neoplasms, benign and unspecified	28.9	18.4	40.9
22. Diseases of the skin and cellular tissue	28.5	20.8	35.6
23. Diabetes mellitus	28.0*	28.0*	-
24. Allergic disorders	27.8	11.8*	37.0*
25. Other diseases of the digestive system	26.5	34.9	20.8
26. Diseases of the genito-urinary system	25.1	18.4	28.9
27. Pneumonia	23.2	24.6	22.4
28. Diseases of the thyroid gland	21.0*	21.0*	-
29. All other respiratory diseases	18.9	20.0	17.7
30. Acute tonsillitis, hypertrophy of tonsils and/or adenoids	17.7	17.4*	17.9
31. Common diseases of childhood (measles, chickenpox, mumps)	17.4	25.5*	14.0*
32. Anaemias	16.3*	24.0*	12.5*
33. Virus infection, unspecified	14.3	14.9	13.9
34. Influenza, grippe	14.2	14.8	13.6
35. Diarrhea and enteritis	12.1	8.4	16.6

\* Based on less than 10 claims.

\*\* Duration under the Comprehensive Plan includes sum of days of total disability and days of partial disability.

PRESIDENT BONNETT — Thank you, Dr. Horan. Accident and health-hospitalization insurance is quite different from life insurance in that it calls for many contacts with practicing physicians and hospital administrators. These multiple contacts lead to multiple problems in public relations.

Dr. Ralph M. Filson, Medical Director, The Travelers Insurance Company, gave us an excellent paper on this subject last year. He is also one of our Association's representatives on the

Health Insurance Council and has consented to lead a discussion for us this year on "Accident and Health-Hospitalization Insurance — A Problem for Mutual Understanding."

Dr. Filson and his fellow members of the panel will state the many problems that confront us and give us their thoughts on the solution. In so doing, they may discuss the value and importance of this type of insurance, not only to the insured but to the physicians and hospitals whose sympathetic understanding and proper use is increasingly necessary to enhance its value and importance. They are all authorities in the field and all are members of the Health Insurance Council.

It is my pleasure to call on Dr. Filson who will introduce his associates on the panel.

DR. RALPH M. FILSON — It is now my distinct pleasure to introduce to the membership of the Association those gentlemen who have kindly consented to give of their time and of their talents as panel members. They will present some of the more important facts and points of view which they have gathered and formulated through a wealth of intimate experiences with those developments and problems currently being encountered in the accident and health-hospitalization fields.

Mr. Wendell Milliman, on my immediate left, is a Past Chairman of the Health Insurance Council, a member of the Society of Actuaries, and is presently Vice-President in Charge of Group Insurance of the New York Life Insurance Company. He is also currently Chairman of the important State Prepaid Plans Committee of the Health Insurance Council.

On my further left is Mr. Ralph Heller, whose earlier interests and activities in the insurance world were those concerned with claim administration. He is a Past President of the International Claim Association. He is currently Second Vice-President of the Prudential Insurance Company of America, and is in charge of underwriting administration in their Ordinary Life Department. He is, and has been for more than a year, our Chairman of the Health Insurance Council.

ACCIDENT AND HEALTH-HOSPITAL INSURANCE —  
A PROBLEM FOR MUTUAL UNDERSTANDING

PANEL DISCUSSION

RALPH M. FILSON, M. D., *Moderator*  
*Medical Director, The Travelers Insurance Company*  
*Hartford, Connecticut*

RALPH T. HELLER  
*Second Vice-President, The Prudential Insurance Company*  
*of America*  
*Newark, New Jersey*

WENDELL A. MILLIMAN  
*Vice-President, New York Life Insurance Company*  
*New York, New York*

DR. RALPH M. FILSON — I am grateful for the opportunity and the privilege of participating in this the first session in one of our Annual Meetings which is to be devoted primarily to the consideration of certain fields of interest which exist within our accident and health insurance business. This will lead into channels differing considerably from those related to life insurance to which we have rather exclusively given our attention in the past. As you have already learned through our President, it is proposed to present this phase of our program by means of a panel discussion.

It is now a distinct pleasure for me to introduce to the membership of this Association those gentlemen who have so kindly agreed to give of their time and their talents as panel members. They will, in due course, present to us some of the more important facts and points of view which they have gathered and formulated through a wealth of intimate experiences with developments and problems currently being encountered in connection with accident, health and hospitalization insurance.

Mr. Wendell Milliman, who is a Past Chairman of the Health Insurance Council and a member of the Society of Actuaries, is presently Vice-President, in charge of group insurance, of the New York Life Insurance Company and Chairman of the im-

portant State Prepaid Plans Committee of the Health Insurance Council.

Mr. Ralph Heller, whose earlier interests and activities in the insurance world were those having to do with claim administration, is a Past President of the International Claim Association. He is presently Second Vice-President of the Prudential Insurance Company of America, in charge of the administration of underwriting in its ordinary department and is now Chairman of the Health Insurance Council.

Mr. Heller and Mr. Milliman are going to have the large share in accomplishing our objectives. These are essentially an outlining of those fields of protection in which accident, health and hospitalization insurances operate, the types of instruments which are employed, and how these become available on the basis of selective choices by prospective policyholders.

Because benefits from a number of the newer lines of accident and health insurance run directly to the cost of medical care, there is correspondingly a growing need for greater degrees of knowledge and understanding concerning them on the part of doctors. Amplification of the details of this need and explanations of methods which will serve to meet it will also be included among our undertakings. These purposes we will try to accomplish effectively through each of our guests initially presenting a more or less formal statement, after which there will be some informal discussion between panel members, to be followed by our attempts to discuss and possibly answer some of those questions which we expect to be forthcoming from the floor.

Although I am completely lacking in experience as a panel leader, I do have personal knowledge of the outstanding qualifications of our other panel members and am thus assured that there will be much of value to us all in what they will have to say.

My function, as I view it, will be largely that of setting the stage and endeavoring to see to it that the right actor appears in the spotlight at the correct time. Initially, I am to be permitted to offer some general observations having to do with the subject which has been assigned. That subject as it appears in our program has been defined by our President as "Accident and Health-

Hospitalization Insurance — A Problem for Mutual Understanding."

The mutuality of understanding applies to insurance people, members of the medical profession, whether in or out of insurance medicine, and hospital administrators.

The unfolding history of development and expansion of the lines of insurance which are to engage our attention covers many years. Initially, growth was gradual and centered about the main purpose of protection against losses of earning power which were caused by injury or disease. This was true of both individual and group types of coverage. Thus, for many years insurance companies were primarily supplying funds to replace a portion of wages normally earned by their policyholders and claimants. They were not so greatly concerned with those types of coverages making payments towards doctors' fees and hospital bills which had to be met by those same people.

In the past couple of decades, however, there has been a transition through which features which were largely supplementary in earlier policies have come to occupy positions of prime importance. Today, those companies which write accident and health business, while they are still actively interested in types of policy providing loss of time indemnities, have become even more greatly involved in problems associated with demands and opportunities for plans providing protection against the costs of medical care. Ever increasing public interest in these areas have led to the introduction of an ever increasing series of insurance contracts which have stemmed from smaller and less comprehensive beginnings.

Initially, these were made available largely on an experimental or trial and error basis. In their evolution, even within the past ten years, they have tended to provide more substantial and realistic types of benefit and to cover greater segments within those fields productive of expense associated with necessary medical care. In their progress they have been responsible for growing pains of a rather wide variety as regards character, location and severity. In spite of, or probably more accurately because of these pains, growth has been phenomenal. Latest reports show the following figures for numbers of people who possess these types of protection to some degree, with a division disclosing those protected

through insurance contracts and those having similiar protection through other agencies.

The latest report of the Survey Committee of the Health Insurance Council, dated September 1953, shows that at the end of the calendar year 1952 there was a total of 91,667,000 persons in this country who had hospitalization insurance, of which number 51,710,000 held this type of protection through either individual or group insurance contracts or certificates.

At the end of 1952, there were 73,161,000 persons covered in connection with surgical costs. Of this number 48,457,000 were protected under individual or group insurance contracts or certificates.

As of the same date, 35,797,000 had medical expense protection. Of this number 15,275,000 were protected under individual or group insurance contracts or certificates.

It is also of interest in this connection to observe that during 1952 the following totals of benefits were paid directly under these lines of coverage which after all are not the only types of protection under which degrees of medical expense benefits are payable.

For hospitalization costs there were payments of \$1,075,000,000; for surgical and medical costs combined there were payments of \$546,000,000; and as a supplementary comment, it may be stated that \$474,000,000 were paid in respect of policy and certificate holders' losses of time. The latter, of course, were all through the medium of insurance company payments.

With continuing evidences of growth indicating as they do the obvious acceptance of the plans by the public, there might well be a question as to why there should be any concern on our part about them, or an observation that if there are any existing problems, these must not be too serious. Knowledge does exist, however, to the effect that there are major problems regarding types of contract, methods of marketing, and more effective administration. To recite some of these features which continue to be of significance and concern, and which frequently confront those of us who have active association with these types of business, I would make mention of the following:



1. Is there a reasonably thorough and uniform understanding on the part of those who ought to have this understanding concerning the basic purposes of these insurances? What are they designed to do and what are their admitted limitations?
2. Does there exist a proper realization, particularly on the part of practicing doctors and hospital administrators, of the difficulties and expenses imposed upon insurers through frequent requests for revisions of contracts and schedules?
3. Has there been within our own business any clear-cut and well supported series of attitudes or arguments concerning the comparative merits of the indemnity principle versus the service principle in medical care plans? If so, what is the position of our industry on this score and how effectively has information in support of that position been disseminated?
4. Are our existing plans defective and do they lead to overuse in hospitalization through an apparent failure to recognize and provide for expensive diagnostic investigations not in themselves requiring admissions to hospital and not in the regular course of medical practice undertaken through hospital facilities?

I anticipate that Mr. Milliman in the course of his presentation will provide us with enlightenment regarding these and other allied questions.

Then, too, we find on the part of individuals within our own business, and coming from doctors representing our colleagues in clinical medicine, inquiries such as the following:

1. Are there adequate and effective presentations through appropriate channels concerning the advantages of encouraging competitive participation on the part of all well-established agencies equipped to provide these protections through plans which are developed and sponsored by different medical associations?
2. Are those accusations which are frequently heard about overcharges and overuse under medical care-cost plans founded upon data of a real or relative character? If these are real, has there been on our part a utilization of established

machinery for the evaluation and correction of any such abuses?

Those areas which are involved through questions of this order come within the scope of Health Insurance Council operations and no doubt Mr. Heller will give us a complete story of those operations a little later.

Practicing physicians are coming increasingly to realize that medical care-cost insurance, developed and distributed as a means of meeting popular desire to care for these types of expenses on a basis of voluntary individual decision and choice, represents a business deal in which they have a vital interest. They realize, too, that it is to their advantage to reasonably co-operate in making these plans work. These attitudes stimulate an urge on the part of most doctors to have some knowledge about facts having to do with insurance contract structures and the proper responsibilities of the medical profession in connection therewith.

If matters of this order are to be presented to doctors, it is likely that they will give more sympathetic attention to the presentation and will be more open to influences through the same if some well-informed member of their own profession were to participate in its delivery. Accepting such a premise, there follows in natural sequence a question as to the source or sources of medical men who possess the required fund of accurate information.

It is perhaps natural that seeking an answer to this question, thought should turn in the direction of the membership of this Association and of allied groups whose primary professional interest has been that of insurance medicine. Certainly, as Medical Directors of companies, whether or not our companies write these lines of insurance, we will be exposed to questions about them from our colleagues who are in private practice just because we are known to be active in the insurance business.

I do not think that I am out of order in expressing the opinion that at the present time there are very few members of this Association equipped to speak with any degree of authority within these spheres. If this actually is the fact, then early appropriate steps should be taken toward the correction of this situation.

There are through our membership many spheres of medical

influence in all areas of the continent. These might well be found to coalesce to the point of an almost if not entirely complete potential of blanketing the whole area out of which we get our business.

There exist both people and sources capable of producing facts and arguments for the further enlightenment of our members in their preparation toward performances as more active advocates of the cause of insurance in its efforts to meet a challenge in the field of medical care-cost plans. In becoming better founded in these matters, we could add greatly to our own general knowledge and effectiveness in the affairs of our respective companies and at the same time arrive at a position where we could speak authoritatively and convincingly about the subject with our colleagues in clinical medicine. Then, with a reasonable division of labor, predicated upon appropriate preliminary studies toward organization of effort, we as doctors in insurance medicine could come to occupy positions of greater importance in those needed contributions toward improved public and professional knowledge, and relations in this field, to the advantage of insurance generally, of our profession as a whole, and of members of the public who are either actual or prospective insured individuals.

I have made mention of the fact that there are sources of information of which we can avail ourselves in preparation for participation in such a program. There are many such individual sources within each of our companies. The central agency within the insurance business which has been organized, vigilant and hard working within the accident and health field and which represents substantially the entire insurance industry in that field, is the Health Insurance Council.

Our Association is a member of that Council. Doctor Ungerleider and I have been your representatives in its deliberations and in its activities. Dr. William Scoins and Dr. Ennion Williams are presently Chairmen of important Council committees. In spite of these facts, I doubt that our general membership has anything like an adequate degree of knowledge or interest concerning Council functions.

The need for changes in these regards has become increasingly

apparent and it is hoped that one of the more important outcomes of this segment of our program today may be the institution of steps through which we will all become more active and more effective in our understanding of and in our participation in these constructive efforts which are going on within these fields of business endeavor.

It is not inappropriate that we, as medical men, should so participate. These young lines of business may aptly be compared to youthful patients having symptoms indicating a need for further study as regards type of healing therapy which may be required, or for the purpose of providing timely guidance through programs calculated to promote healthful growth and development. As I have already suggested, more will be heard, probably chiefly through Mr. Heller, regarding details having to do with the Health Insurance Council.

Recently an Accident and Health Committee has been organized in this Association. Possibly that Committee may represent the agency through which closer liaison between the Health Insurance Council and the Medical Directors Association can be built.

I feel that we do have some cornerstones already laid and that what is now needed is some expert definition of what might be termed "the know-how" which we ought to have. This, supplemented by an energetic will to avail ourselves of every item of information on the subject and by our agreeing to volunteer or to provide on request, well-informed discussions with our friends in private practice, can be the means of a major contribution in the erection of a superstructure of real accomplishment.

It is now my pleasure to present Mr. Heller, who will continue our discussion of this subject.

MR. RALPH T. HELLER—It has been suggested that when making this contribution to the discussion of the question "Accident and Health Hospitalization Insurance—A Problem for Mutual Understanding", I set forth something of an industry viewpoint as seen by the Health Insurance Council, which, as you know, is the organization established by the accident and health industry to deal in an organized way with doctors and hospitals. This I am doing. I wish to do three things. First, to point out the need for the accident and health industry to considerably expand and improve its relations with doctors and hospitals. Second, to point out why there is need for an organization such as the Health Insurance Council and to tell you very briefly what it is doing. And, third, to express the hope that the Medical Directors and their staffs who are in a unique position to furnish guidance and assistance to the industry in its dealings with doctors and hospitals will give serious consideration to increased participation in the program the industry is carrying out along those lines.

The question naturally arises, why do we need an expanded program to deal with doctors and hospitals? Haven't we dealt with them for years and haven't things gone along pretty well? Or the question might be, why a Health Insurance Council? Is there a need for this sort of thing? Haven't we, perhaps, too many meetings and organizations already without another one of this nature? The time allotment prevents any attempt to deal fully with these questions, but I should like to set forth a few of the matters that seem to indicate the need for expanded activity.

Probably a good place to start is with the situation created by the fact that modern medicine and modern hospital care have made it possible for our society to enjoy increased longevity and generally improved health. Tremendous improvements have occurred in these fields, and many further improvements lie ahead. The improved care and facilities now available are being increasingly demanded and received by the general public, which is as it should be.

At the same time that this improved care has become available, the problem of meeting the cost of the care has grown. The length and complexity of the physician's training, the increasing use of costly drugs and laboratory equipment, the greatly increased cost

of hospital care and the general inflation of all costs—all have tended to make the problem of meeting the medical and hospital bills a more serious one. A small portion of the population can meet all its bills without difficulty. Another segment will have assistance of one kind or another in meeting its bills. But if the great bulk of us are to meet our doctor and hospital bills without some strain, some kind of prepaid financing is necessary. That financing may take the form of some voluntary form of insurance or of a compulsory program financed out of general tax funds. Compulsory health insurance is not the immediate threat that it appeared to be several years ago, but we must not for a moment feel that there has as yet been a permanent disposition of the matter. People, I believe, will insist on adequate high-grade care regardless of the method by which the resulting bills are met. If at any time it appears that the voluntary insurance system of which we are a part fails to reasonably meet the needs of the people, the result, I am sure, will not be that the people will do without adequate care. Rather, it would probably be to a turning to some governmental system which would promise to provide what the voluntary system was unable to provide.

The voluntary system fortunately has demonstrated amazing vitality and capacity for growth. The latest figures of the Health Insurance Council, as of the end of 1952, indicate that 91 million people have some protection against hospital expense; 73 million some protection against the expense of surgery; and 35 million some measure of protection against medical costs. Fifty-one million people carry hospital insurance, 48 million carry surgical insurance, and 15 million carry medical expense insurance with insurance companies on either the group or individual plan. Very little of this insurance existed 20 years ago. The very extent of the coverage, however, makes it more necessary than ever that the insurance be made to satisfactorily fulfill its purposes and the greater is our obligation to the public to see that the voluntary system works. Obviously, too, our risk is much larger if for any reason the voluntary system fails to work.

If we contemplate this vast body of voluntary insurance giving consideration to the kind of benefits we are providing and the factors surrounding the settlement of claims, it soon becomes ap-

parent that in almost every phase of the business our relationship with doctors and hospitals is involved. Nor does it take long to see that we who seek to provide insurance against the cost of the services and that those who provide the services must have an intelligent understanding of and sympathetic consideration for the problems of each other if the public is to be properly served by both of us and if we are both to achieve reasonable ease and economy of operation.

A few samples will indicate what I am talking about. Take the economic relationship we bear to one another. Our rate structures and our form of coverages depend on the charges of hospitals and doctors. We have a great need for keeping abreast of changes in medical care and practice. Doctors and hospitals in turn cannot help but have an interest in what the insurance industry does. The same millions of people we insure must be dealt with by them as patients and debtors. They have an interest in how well we gear our products to the practicalities of hospital and medical care. A substantial share of the income of doctors and hospitals is already being provided through insurance prepayment plans. A much larger share will be so provided in the future. Again, take the tremendous number of contacts now literally running into the millions yearly between representatives of the insurance industry and doctors and hospitals. Consider the vast paper work and the possibilities of irritation it provides. With contacts on so vast a scale it just becomes a matter of common sense that we seek to make them in a manner that is as pleasant and as efficient for each group concerned as is possible.

The items of joint concern could be amplified, but I think enough has been said to point up the need for a greatly increased interchange of viewpoint between the insurance industry and doctors and hospitals. If this view is accepted, the next question becomes, how do we go about the matter? Just what shall we try to do? With whom shall we try to do it? It was consideration of these matters that brought about the formation of the Health Insurance Council. Much good work can, of course, be done by individuals, by individual companies, and by individual trade associations. This is desirable, and it is hoped that work in these areas can be increased, but a little study of the problem will indicate that

for a more effective program a broader organization is necessary. If hundreds of companies are to have some means of communication with well over a hundred thousand physicians, obviously representative groups will have to be established to consult and discuss with other representative groups. Furthermore, if we are to communicate ideas and conceptions and some understanding of insurance principles, there must be to some measurable extent at least an agreement on what those conceptions and principles are. Then there are areas where it becomes apparent that what is necessary is an industry-wide viewpoint and that viewpoints with individuals or lesser groups will not adequately meet the demands of the situation however excellent the individuals or groups involved. The Health Insurance Council was formed about seven years ago. It is, as you know, composed of the following nine associations:

- American Life Convention
- American Mutual Alliance
- Association of Casualty and Surety Companies
- Association of Life Insurance Medical Directors
- Bureau of Accident and Health Underwriters
- Health and Accident Underwriters Conference
- International Claim Association
- Life Insurance Association of America
- Life Insurers Conference

You will notice that there is representation from substantially all of the principal associations active in the accident and health insurance business. It is a broad group embracing large companies and small companies, stock companies and mutual companies, companies writing group insurance and companies writing individual business. The work of the Council is carried on by staff members of the trade associations and the efforts of company men. Approximately 100 company men are occupying committee positions of one kind or another in the Health Insurance Council.

Mr. Andrews talked about the Health Insurance Council at your meeting a year or two ago. I shall therefore make my comments on the work of the Council rather brief. Basically, of course, the Council is seeking to improve relations with doctors and hospitals to the end that the voluntary insurance system may survive, to the end that our competitive position in the field is preserved and to



the end that the voluntary system may survive in a form which satisfactorily meets all the reasonable needs of the public. Specifically, through a Hospital Committee we have worked out admissions plans permitting persons insured with us to receive credit against their bill for the amount of their insurance protection without having to first make payment of these items in cash and securing reimbursement later. This problem reached a very acute stage a few years ago when many persons insured were not permitted to enter hospitals without down payments. We have simplified the work of hospitals in many areas by the use of uniform claim blanks and assignments and have sought generally to improve our relations with hospitals. An experimental plan designed to do for the individual hospital policyholder what has already been done for the group policyholder is in operation. There is a Technical Subcommittee that is making studies of various technical problems which it is believed might be helpful to the companies in the conduct of their business. We have a State Prepaid Plan Committee which has worked in many places with doctors at the local level. Its principal effort has been directed to developing plans with doctors affording protection against the expense of surgery. This undertaking has involved preparation of a fee schedule which is underwritten by insurance companies with the arrangement usually providing that in the cases of lower income groups, payment in the amount set forth in the policy will constitute full payment to the doctor. Varying success has been met with in this program and a search is underway to see whether our methods cannot be further improved. We have a Survey Committee which puts out an annual survey furnishing authoritative information on the spread of voluntary health insurance. This includes Blue Cross, Blue Shield and many other private plans as well as that of the insurance companies. This has been a very successful medium for informing the profession and the general public of the extent of the growth and of the dynamics inherent in voluntary health insurance. A Medical Liaison Committee, of which Dr. Scoins is currently chairman, has endeavored to keep the medical profession at the national level informed of the developments in the voluntary health insurance field and of the progress that is being made in the fields of insurance with which we are particularly concerned. We have sought to keep the door

open for equal treatment for all voluntary health plans at the hands of the medical profession. The committee believes that there is a need for more widespread contact with doctors at the local levels, and the committee is presently studying that problem. A year or so ago we established an Information and Publications Committee which is engaged in the preparation of suitable material by article, pamphlet and other forms for use with the medical profession, with hospitals, and with other interested groups. Material has been prepared for publication in medical journals. Everyone who has studied our educational problem quickly becomes aware of the need for an adequate telling of the insurance story. The committee is devoting its primary attention to this matter. A special project to simplify and improve our claim blanks is underway with the aid of the International Claim Association.

If the Health Insurance Council, or any organization working in this area, is to do the job that is desired by the accident and health industry, it will require the active support of all the insurance groups which have an effective influence on the matters we have under consideration. Thus, sympathetic support is needed from the sales department, the claim department, and from the actuaries who are basically responsible for the contents of the contracts and who are trying to successfully ponder the future course of voluntary health insurance. The list could be lengthened, but I wish to mention just one more group, namely, the Medical Directors who are particularly qualified to assist by reason of their membership in the medical profession and their understanding of insurance matters. Many of us in our respective companies — as I have in mine — have received much assistance from the medical department in developing solutions to some of the problems inherent in medical care insurance, and we in the Health Insurance Council have been directly and specifically helped by the work of many of your members. But without minimizing these contributions I think it can be said that the industry would be aided if we were to have the benefit of a more organized and sustained effort on the part of our physicians. That this has not been so has not been the fault of our Medical Directors. Rather it results from the fact that the business developed in a manner which left

the actual conduct of the business largely in the hands of the actuarial, the sales, the underwriting and the claim departments with the doctors, in many instances, being appealed to — generally speaking — for advice on technical or specialized points. Certainly we have not sought the aid of our Medical Directors as we should in the broad field of improving relations with the practicing profession and with the hospitals. There have been great gains in mutual understanding on the part of doctors and hospitals and insurance groups. There remains a wide field for the insurance company physician to act as an effective interpreter of medical and hospital concepts and practices to the insurance industry and of insurance concepts and practices and principles to the medical profession and the hospitals.

This is a potent group here this morning and if it will, it has within its power to do much for the accident and health industry in the areas we have been discussing. I hope that it will.

DR. FILSON — Thank you, Mr. Heller. We shall continue the discussion with the contribution of Mr. Milliman.

MR. WENDELL A. MILLIMAN — As Dr. Filson has told you, it is our hope that this morning's session will make a contribution to a better mutual understanding between the medical profession and the insurance industry of the problems of accident and health insurance.

The physician rubs shoulders with accident and health insurance throughout his business day. Many of his patients look to him for advice as to the health insurance policies which they should buy. An insured person cannot collect benefits under his accident and health insurance policy without the co-operation of a member of the medical profession. The proceeds of many types of accident and health insurance policies are used to pay bills for medical expenses and these proceeds constitute a substantial portion of the doctor's income.

The interdependence of accident and health insurance and the medical profession is not just a matter of paper work. The future pattern of the practice of medicine is, in a very real manner, tied to the future of voluntary accident and health insurance. It follows that doctors should be well informed as to what this form of insurance is, how it works and what the physician can do in order to help it to develop along lines most beneficial to the medical profession and the public.

The third party who is very much concerned with the accident and health insurance policy is the insurance policyholder. Since we are talking in terms of large groups of people, and I have already mentioned the medical profession and the insurance industry, let us refer to this third group as the public. Accident and health insurance has developed as the result of public demand. It seemed to arise from the great upsurge of public interest in personal security, particularly as people became more security minded during the 1930's and 1940's. Government became interested in the problem and some states passed cash sickness disability benefit laws. Some employers broadened their employee benefit plans of their own accord and others did so under pressure from organized labor. Meanwhile, and more significantly, the volume of protection purchased by *individuals* grew at an impressive rate — all in response to a growing awareness of *need* on the part of the public. Therefore, the co-operation between the medical pro-

fession and the insurance industry must spring from an awareness of the public which we both aim to serve.

As my contribution to this morning's session I want to outline briefly a few of the fundamental factors required to make accident and health insurance work and to describe the various forms of accident and health insurance now being offered to the public.

Accident and health insurance is designed to indemnify, in whole or in part, for losses due to accidents or illnesses. Loss in this sense may be either income presumed to be lost due to a period of disability, or expenses of medical care due to that disability, or both. As doctors you are naturally more interested in those forms of accident and health insurance which are designed to reimburse the insured for medical expenses. For the sake of brevity I am going to limit my discussion to these forms of coverage.

There are four main types of insurance protection against the expenses of medical care. They are hospital, surgical, medical and major medical expense insurance. This protection is provided by a large number of organizations of various types. Among the various types of organizations are life insurance companies and casualty insurance companies, both stock and mutual, as well as the local type of insurance companies sponsored by hospitals and doctors which are generically known as Blue Cross and Blue Shield.

Hospital expense insurance is the most widely held form of such insurance. Nearly three out of five persons in the entire population of the United States — some 91 million people — are now protected under some one of the various forms of hospital expense insurance. Some of this insurance is of a "service" type, i.e., it provides for payment of the full amount of the hospital charges — subject, usually, to a variety of limitations. Much of it, however, is of the cash indemnity type, providing (1) a specified dollar amount per day of hospital confinement to be applied against the charges for room and board, and (2) reimbursement of charges for other hospital services up to some specified limit.

The second most popular form of protection is surgical expense insurance. The number of persons with this form of coverage at the end of 1952 totalled 73,000,000. Most of this insurance

is of the indemnity type providing payments, in accordance with a schedule of allowances in the policy, to be applied against surgeons' charges. Some of the insurance, however, is on a "service" basis. This is possible, of course, only where there are agreements between those who provide the service, i. e., the doctors, and the insurance companies. Where the "service" basis is found it is usually subject to some income limitation. This "service" feature is included in many Blue Shield plans. It is also included in policies issued by other types of insurance companies in several states, in accordance with plans sponsored by the Medical Societies of those states. Where these plans have been developed, the counsel and guidance of the Health Insurance Council has been sought by the state medical societies.

There are several types of coverage designed to cover the expense of medical treatment other than surgery. At the end of 1952 nearly 36,000,000 people had some form of such medical expense insurance. The most common form of this coverage calls for the payment of benefits with respect to the expense of in-hospital calls by doctors for other than surgical treatment. Other forms of medical expense insurance cover expenses of home and office treatments, and in some cases the expenses of laboratory, x-ray and other examinations for diagnostic purposes.

The fourth type of medical expense insurance is commonly called major medical expense insurance. It covers all types of medical care required in the treatment of an illness if the total cost of such care exceeds a stipulated deductible amount. Beyond that point the insurance policy provides for reimbursement of a substantial proportion of the medical costs, but the insured is required to pay a portion of the charges himself. The insured thereby becomes a coinsurer of his major medical bills.

The insurance companies rely upon the devices of deductible amounts and co-insurance in omitting many of the limitations in major medical expense insurance policies which are included in other types of medical expense insurance policies. Before discussing major medical expense insurance further it may be wise to consider some of the practical problems of accident and health insurance, and how these problems give rise both to limitations in insurance policies and to other practices with which insurance

companies seek to protect themselves.

You are all familiar with the broad distinction between individual, or personal, accident and health insurance contracts and group accident and health insurance contracts. Throughout our discussion this morning you will find important distinctions between these forms of coverage.

In general, individual accident and health insurance contracts are more restricted than are group insurance contracts. This is a natural result of the fact that only a relatively small proportion of the potential market is insured under individual accident and health insurance policies and the further fact that the amount of insurance which each individual carries is subject to personal choice. Under these circumstances the insurance company, in order to guard against adverse selection, must underwrite each risk individually. The applicant for personal insurance usually knows if he has some physical condition which might materially affect the risk which he is asking the insurance company to assume. Therefore, in order to guard against insuring a disproportionate number of impaired risks the insurer must ask many questions about the health history of the applicant. It relies upon these statements in underwriting its business, and it must, therefore, have protection against the applicant who misrepresents or conceals facts in answering these questions.

It is in the selection process that group insurance differs most markedly from personal insurance. Group insurance is usually issued without any requirement of evidence of insurability from the individuals to be insured. Evidence of insurability can be waived because the individuals who are eligible for the insurance are bound together as a group by some strong interest other than that of obtaining the insurance. Experience has shown that the natural interest of the employer in selecting efficient employees acts as a method of selection such that the group usually will have normal and predictable morbidity.

As a result, the insurer can afford to assume risks under group contracts which it cannot afford to assume under individual contracts. For instance, while individual contracts usually provide for the exclusion of pre-existing conditions, group contracts do not contain such exclusions. Again, frequently at the time a

claim is submitted the insurer learns facts concerning the health history of the owner of an individual policy which should have been disclosed in the application for the policy. If these facts were material to the acceptance of the risk the claim may be declined. Since group insurance is not underwritten on the basis of individual statements of health there is little chance of such controversy in settling claims under group policies.

The selling of insurance policies and the other things an insurance company must do, such as preparing policy forms, setting premium rates and underwriting risks, are all inter-related functions. Let us take a few moments to look at the inter-relationships of these functions and some of the ways in which they shape the contracts we sell.

First, the insurance policy must be a salable one. It is easier to sell limited coverage at a moderate price than it is to sell complete coverage at a high price. In addition, it is easier to persuade people to insure those dramatic types of medical care which may involve substantial expense. It is largely for these reasons that hospital and surgical expense insurance have been the most popular forms of medical expense insurance coverage.

Second, when insurance is limited something is left out. The contract must have exclusions and limitations. Since the insurer writes the contract any ambiguity in it will be interpreted by the courts in favor of the policyholder. Consequently, it is essential that the contract be precise as to what is insured and what is not insured. It is equally important, in order to maintain good relationships between the public and the insurance industry, that the definition of what is insured and what is excluded be in terms that are easily understood and that make sense to the average policyholder.

Unfortunately, there are few clear-cut dividing lines in the field of medical care. The limitation of medical expense benefits to surgical procedures is one of the most precise and readily understood limitations. However, we frequently find policyholders who are disappointed because they have no coverage for a relatively expensive series of medical treatments which were undertaken by the physician as an alternative to surgical treatment of that con-



dition. Insurance to cover charges for hospital care can also be defined precisely and in terms which almost anyone will consider reasonable. Yet who has not heard the complaint that the insurance policy forces a patient to go into a hospital in order to have the expense of diagnostic x-rays covered by his insurance.

The plain fact is that any exclusions, or limitations, and some are unavoidable, are bound to give rise, on occasion, to disappointment and misunderstanding. It is the existence of these limitations and exclusions which has given rise to the reference to "fine print" in accident and health insurance policies. The fact is, of course, that there is no fine print in these policies, for limitations and exclusions always appear in type that is as large, or larger than that used in the balance of the policy.

Third, both the desire to develop salable policies and the desire to have precise and understandable contracts have led companies to emphasize insurance of hospital and surgical expenses. There are administrative reasons as well why companies prefer to limit their coverage to these contingencies. The inclusion of other forms of medical care means including a relatively large volume of relatively small claims. The expense of handling the paper work alone on these small claims is a substantial item in relationship to the benefit payments.

Fourth, it is possible for the individual to postpone for some time the care of certain conditions. If people could buy individual insurance which would provide immediate coverage of these postponable conditions, many policies would be bought just to provide coverage for such conditions, and then would be dropped. The very attraction of such an arrangement to the potential insured (the prospect of a quick profit) makes it unattractive to the insurer. Consequently, individual accident and health insurance policies contain provisions restricting the coverage of certain postponable conditions and of pre-existing conditions. Much misunderstanding of accident and health insurance results from claims made during the first few months of insurance where the claim resulted from a condition in existence when the insurance was applied for.

In accident and health insurance, as in almost everything else, you get what you pay for. However liberal or restrictive the in-

surance policy is, the insurer determines a premium which it considers appropriate for the risk which it will assume under the policy.

You are familiar with the process followed by an insurance company in underwriting applicants for insurance in order that the risks which it accepts may be of the quality assumed in its premium structure. In addition to the protection which it has in the selection of risks at issue, the insurer has safeguards at various times during the lifetime of the contract.

First, at the time of a claim the insurer — particularly under individual accident and health policies — seeks to develop information to determine whether the claim is within the terms of the policy. The main concern here is as to whether or not the medical care is in connection with a pre-existing condition.

Second, the insurer may reserve the right to cancel the policy, or to refuse to renew it. Among other things, this gives the insurer a chance to drop a policyholder where there is indication of concealment of information in the application. The rate of cancellation, or non-renewal, on the part of the better known accident and health insurers is very low.

The use of an unrestricted right to cancel appears to be becoming less common. It is being replaced, in large part, by provisions which give the insurer a right to cancel only on annual renewal dates. The right to refuse to renew is sometimes further restricted, one form of such restriction being a provision under which the policy may be cancelled only if a group of policies, in which it is included, is cancelled.

The non-cancellable form of accident and health policy has, of course, a considerable attraction for the insurance buying public. However, because of the longer period for which the insurer is committed to the risk, premiums are higher. Further, insurance companies are much more selective in issuing non-cancellable policies, so that only a relatively small proportion of the population can obtain such coverage.

Under group insurance policies premium rates may be changed from time to time as experience develops. Consequently, while group policies frequently contain cancellation provisions, insur-

ance carriers rely on their right to increase premiums on renewal to correspond with the character of the risk.

I have commented briefly on the reasons for the various safeguards — policy limitations, adequate premiums, underwriting, settlement of claims and cancellation — which insurance companies use in issuing accident and health policies. It is clear, I believe, that each of these safeguards, when properly used, has good justification. Since the exercise of these safeguards necessarily involves individual judgment, on occasion some of them will be applied in a manner which will cause misunderstanding. While no excuse can be made for abuses of the institution of voluntary insurance, they are the exception rather than the rule. The bulk of the accident and health insurance now in force is carried by companies that are sincerely doing their best to provide good and adequate protection to the insuring public.

In order to have a proper perspective of the problems which we are discussing this morning it is important to know that insurance to cover the expenses of hospital and medical care has been developed almost entirely within the past 20 years. Obviously it is still in an experimental stage. However, many of us have the feeling that in some respects these experiments have been going down the wrong path. Too many of the benefits being paid under these more recently developed plans are for medical expenses which the insured could have borne directly with no hardship. On the other hand, there are too many cases where the insured has medical expenses which are very much in excess of the amount he can recover under his insurance.

The desire to meet the need for protection against these heavy medical bills has led, during the past few years, to the development of major medical expense insurance. As I have already indicated major medical expense insurance is basically a form of deductible amount insurance, similar in principle to automobile collision insurance. Under this form of insurance all expenses, in excess of a deductible amount, for the medical care of the insured in connection with a single illness are covered. Various deductible amounts, such as \$100, \$300 or \$500 are used, while sometimes the deductible amount is expressed as a percentage of the insured's annual rate of earnings. These plans when sold on a group in-

surance basis are usually sold in conjunction with underlying plans covering hospital and surgical charges. In such cases the deductible sum is defined as either the stated amount, or the amount of benefits provided by the underlying plan, if greater.

Most plans also incorporate a coinsurance feature. The coinsurance feature requires the insured to bear a proportion of the expenses such as 20 per cent or 25 per cent, in addition to the deductible amount.

Major medical expense insurance is a very promising development in the field of health expense insurance. It leaves to the individual the problem of meeting the usual small medical bills resulting from minor illnesses and gives him relief when he really needs it.

There are, however, some serious problems involved in developing this type of insurance. In the first place there is considerable doubt as to whether we can get sufficient public acceptance of this type of insurance. Will the average wage earner be willing to buy a medical expense insurance program which gives him no assistance in paying his medical bills until he has paid out a substantial deductible sum? Will he be willing to accept the principle of substantial sharing in the charges in excess of the deductible sum? In order to be an effective form of health insurance such an insurance program must be designed to serve all income bracket satisfactorily.

The second major difficulty arises from the very breadth of the coverage. The only controls on the amount of the charge by the physician or surgeon are, first, they must be "reasonable" charges for "necessary" services, second, the insured individual must pay a share of these charges and lastly, the good conscience and self-control of the medical profession.

This is one of the aspects of medical expense insurance which makes one acutely aware of the interdependence in that field of the insurance companies and the medical profession.

There must be cooperation between the insurers and the doctors if any broad form of voluntary insurance is to prove to be an effective part of the solution which the free enterprise system offers to the problem of the unpredictable impact of medical ex-

penses upon the individual. On the one hand the insurance companies will have the burden of trying to popularize this form of coverage, to sell it to a substantial segment of our population. On the other hand the medical profession will have to cooperate in finding methods of preventing members of their profession wrecking the plan by making excessive charges.

DR. FILSON — You must have been impressed, as I have been, with the scope and variety of worthy objectives associated with insurance undertakings in the accident and health-hospitalization field. We, likewise, cannot fail to recognize that the implementation of these broad purposes presents difficulties and problems which ought to be of mutual interest and concern to our business and to all members of our profession. Our speakers have left little doubt that one of the main channels through which these difficulties and problems may be met is that of greater degrees of understanding, leading to more effective cooperation on the part of doctors, whether they be in insurance medicine or in private practice.

As a matter of fact, it is suggested in this connection that we, as members of this Association, may be something in the nature of godparents to a set of lusty, howling quadruplets, recently born into the hitherto quiet and well-behaved family of Mr. and Mrs. Accident and Health Insurance. The accouchers at the time of the birth of these quadruplets were actuaries and underwriters who probably had but minor suspicion that the infants would develop into problem children. They have been named Hospitalization Cost Insurance, Surgical Schedule Insurance, Medical Reimbursement Insurance and Major Medical Expense Insurance.

As is so often true, offspring representing multiple births, especially of the quad and quint variety, tend to attract unusual degrees of public interest and attention. This has been true in the cases of the accident and health quadruplets. As they have increased in age and stature, they have increasingly realized the attention which they attract and they have become more than usually self-assertive and hard to manage.

The parents, in attempts to cope with the increasing difficulties associated with the control and guidance of their children, have

been able to win significant assistance through the establishment of something in the nature of a Regency Board called the Health Insurance Council. Our Association has representation on that Board but more recently a realization has developed that not only our appointed representatives but actually all of us must assume a role simulating that of godparenthood. The existence of such a status demands a greater degree of understanding of the responsibilities which it carries and some clear definition of functions through which those responsibilities may be effectively discharged. I believe that some steps in the direction of meeting these demands have already been taken here this morning.

Along with us, our colleagues in clinical medicine have a joint stake in the satisfactory rearing of the children about which I have been speaking. There is a public demand that they be nurtured in the best of those traditions which are a part of the high standards of society in our time and in our nation. The public temper in this regard is such that if for any reason this should fail in its accomplishment, penalties of a distasteful character to all of us might have to be imposed. Thus, it is not surprising that attention focuses upon the medical profession both as regards its members in insurance medicine and those in private practice. We are expected to play our full parts and to act as leaders in promoting the following purposes:

1. The exercise of joint endeavors to establish the most healthy environment possible for these so-called godchildren.
2. The maintenance of careful watch against threatened ills and the prompt prescription and application of preventive measures whenever and wherever these may be considered to be indicated.
3. The development of wills and skills to be employed in diagnosis and in the detailing of appropriate treatment if and when signs of actual illness may appear.

Our guests have already given us a fund of valuable information touching upon historical backgrounds, upon known facts about situations as they exist today within those segments of the insurance business which have been discussed, and upon areas within which clearer recognition of problems and dispositions to

understand their origins and their essentials may promote closer and better informed liaison between all branches of the medical profession. The membership of this Association may well take the lead in advancing liaison of this character. It can certainly do nothing other than be of significant assistance in improving and in making more extensively available the better grades of appropriate insurance instruments. These, as we view it, hold the greatest hope of enabling our citizens to implement their will to protect themselves against those heavy costs of medical care which are not readily amenable to inclusion in the average individual budget.

We have been fortunate to have heard about these matters from two exceptionally able and well informed authorities. Mr. Heller and Mr. Milliman have been and are today hard-working leaders in the Health Insurance Council and in the affairs of their own Companies. They have struggled with the varied and seemingly never-ending difficulties in the every day workings of accident and health-hospitalization insurance. They know its weaknesses, real and alleged. They know its great features of strength, existing and potential. They know wherein it has succeeded and wherein it has failed to live up to expectations. They know also, as we and our friends in private practice know, something of the nature of those alternatives which are likely to be proposed or even instituted if, through shortsighted viewpoints, insurance protection against medical care costs should be permitted to do other than gain in growth and strength. They have brought these types of knowledge, unexcelled in our business affairs, to our assistance as we meet in a mood to learn more fully about this very important challenge in our insurance world and to become more thoroughly dedicated to continued study and activity within a field where we each have opportunities for real service.

With the foundations which have been laid through those presentations already made, we have now reached a point where specific questions appropriate to the subject are to be presented for consideration and some informal discussion by members of the panel.

In order to start off this question and answer procedure, I shall offer a few questions which have been established as of general

concern. When these have been dealt with and if time still permits, there will be an opportunity for additional interrogations of the panel by members of the audience.

When this program was originally designed, it was planned to have a second member of the Association on the panel. That, unfortunately, could not be carried through to a culmination, and I agreed to serve instead of the other member of the Association, who had originally been expected.

However, in view of the time which has been consumed with these presentations, I shall eliminate any further comments which were originally planned and prepared, and proceed to a brief discussion period. We anticipate some informal interchange of questions and answers, and if we can have the questions on the cards that were distributed we will eventually include some of those too. Will Dr. Horan and Dr. Williams now join us here, please?

Mr. Milliman, I would like to propose a question to you. Some of these questions, by the way, have been received in advance of this meeting. Everyone realizes, I think, that inquiries were sent to the many companies concerning the general question and questions were solicited. You, as a member of the Actuarial Society, have been making studies of the amounts of surgeons' fees and relationships between surgeons' fees. Have you heard any comment to the effect that insurance companies, through these instruments, were undertaking to set fees for practicing physicians? If you have heard anything about that would you comment concerning it, and indicate whether or not you believe that the practicing physicians have the correct understanding.

MR. MILLIMAN — There has been a fair amount of misunderstanding, I believe, as to the nature of the schedules of surgical allowances which are in the insurance company's policies. I think most of the misunderstanding was on the part of the public rather than the doctors. It might be helpful to understand the situation here if we go back rather quickly to the way the surgical schedules were developed. This occurred back in 1937, in the development of the original \$150 schedule which, at that time, was designed to cover charges to industrial workers in non-metropolitan communities. Of course, there has been inflation since then. Back in 1945,



1946, and 1947, the companies got sufficiently interested in this question so that through the Actuarial Society a study was made of some 50,000 claims, to find the actual charges which physicians had made on those claims for their surgical services.

Out of the results of that study, a new surgical schedule was devised, which has come to be known as the \$200 Surgical Schedule. Both of these two schedules I refer to are used largely in connection with group insurance policies, but have been used as a basis for developing individual policies as well.

In view of the subsequent inflation, there has been common usage of multiples of this \$200 schedule to try to meet current situations. Throughout all this development of the surgical insurance and insurance policies, the insurance companies have tried to make it clear — I think without much success at times — that all they are doing is providing money with which the insured can pay part or all of the surgical bill, but they do not attempt to set the surgical charge. That is up to the doctor, as it must be. It is only in a community where the medical society has established a formal plan — such as in Tennessee, Wisconsin, Cleveland, and Rhode Island — and the doctors have agreed on a fee schedule they promulgated for lower income groups, and accept these payments in full payment of their charges, do the insurance companies represent that they are selling insurance for the full amount of surgical charges.

DR. FILSON — Mr. Heller, a question appears here which I think you are well equipped to answer. Does insurance need the aid of other agencies, apart from the medical profession, in these developments and, if so, what agencies, and how is their assistance to be procured?

MR. HELLER — Well, obviously, in implementing this program, we need the support of any segment of the insurance industry that could influence the program. In addition to the doctors, I mentioned in my talk the claim men. They make these millions of contracts. They are involved in the settlement of all these claims. They provide the forms which irritate the doctors. They ask for the supplementary information. Obviously they must, for instance, be made an integral part of this program.

We must reach top management, the heads of the insurance companies. You have heard me say that we have 100 men engaged in this to a greater or lesser degree. They are, by and large, a group of rather able men. That means that those men whose time is very valuable and whose time can be well utilized by the company on its own company problems have to devote it to this purpose. Obviously we could not do that unless we have the support of top management and we would not have these 100 men if we did not have the support from top management.

Again, if the group insurance sales people are not willing to implement by sales effort the work of the Council with doctors, obviously we are not going to have much success in developing actually successful programs.

DR. FILSON — Dr. Williams, I have a question here which I think you can answer. You referred to the fact, in your paper this morning, that in underwriting the hospitalization and surgical insurance it was necessary to make inquiries of attending physicians and hospitals on many occasions. The question reads as follows: "What is an average fee paid for medical statements obtained from (a) physicians, and (b) hospitals?"

DR. WILLIAMS — This has varied over the years. We started allowing attending physicians and hospitals to set their own fees about twelve years ago. At that time the average fee ran about \$1.25. The last time we investigated it was \$2.30.

DR. FILSON — Dr. Horan, here is a question that you may be able to answer. You dealt rather extensively this morning with underwriting guides in health and accident underwriting. This question reads: "What is the best, or a good volume, to consult regarding which cases should be underwritten?"

DR. HORAN — I do not believe that there is any volume that has been accepted as authoritative. I think each company wants to reserve the right to make its own rules. The need for such a volume is not so evident when you realize that the contracts differ so widely, as between one company and another. Each company will have to eventually compile their own underwriting guide.

DR. FILSON — Mr. Heller, I think you once had much work to do with claims. This question is, "If our business is to provide

money to make it easier for the individual to pay his medical bills, should we then pay money directly to a doctor? It seems to invite difficult correspondence."

MR. HELLER — The way your past rises to haunt you at unsuspecting times!

Did I take the one question to be: whether we should pay 100 per cent of claims? Is that what it is?

DR. FILSON — No, the money that we do pay for medical bills — should it not be paid directly to the doctor?

MR. HELLER — I think that to whatever extent it may be feasible to do it, this is a highly desirable thing. It will cement relations with the doctors and the medical profession generally. The business has grown up in such a fashion that by reason of state law, and for other considerations, much of the money that is payable to doctors for, let us say, surgical operations, is paid to the patient. And sometimes there is a slip between the patient and the doctor and he does not get all his money. This is true particularly in group insurance.

In one or two states there have been specific changes in the law permitting us to make payments direct to doctors and hospitals. I think that generally speaking it is a desirable thing that the insurance fulfills the purpose for which it is taken out. In other words, for a surgical operation, the money goes for a surgical operation and not for a TV set.

DR. FILSON — Would you comment concerning the assignment instrument in that connection?

MR. HELLER — I cannot give you the percentage of business today under which claim payments are being made directly to doctors and percentage of cases in which payment is not being so made. But I do know that many cases are today employing assignments and that a goodly sum is being paid directly to doctors.

There is, I might say, some diversity of viewpoint on this, and some people have another concept — that this money ought to go through the patient's hands, and he must learn the value of it. Quite a story is made out along those lines. I think there is some

merit to it, but I do not think it reflects the practicalities of the situation today.

DR. FILSON — Mr. Milliman, I have a question that is general in character and if you could comment on it briefly I would appreciate it. "Is the insurance approach to the objectives of so-called prepayment of medical care costs one which can or will meet majority needs? What, if any, are its chief shortcomings in these regards? If there are areas in which insurance does not now operate, can it be developed to include these?"

MR. MILLIMAN — A brief answer to that might take all morning. I think it is obvious that the voluntary health insurance programs cannot meet all of the demands made upon it. It cannot provide coverage for those who are wards of the state, those who have to be supported by relief.

It is difficult to provide the coverage for those who have difficulty paying their small medical bills directly, because this is primarily a means of budgeting expenses.

It is also difficult to meet the needs of those who are aged. Part of the problem is that of accumulating money during the active working period to take care of the higher medical costs of the aged.

There is difficulty in meeting the problem of those in rural communities and those who are chronically ill, as well as those who are impaired.

But, for the vast majority of self-supporting persons, I think it is true that voluntary insurance can meet the major impact of the medical bills.

DR. FILSON — Dr. Williams, I have a question here which I believe you could clarify for us in a very few moments. "How do you identify the surgeon in places where general practitioners do surgery in those cases when surgical benefits are payable?"

DR. WILLIAMS — We pay for the procedure, regardless of whether the man is a surgeon or not. If a general practitioner performs an appendectomy, he gets paid for an appendectomy, according to the surgical scale.

DR. FILSON — Mr. Heller, will you please briefly state again

what part the Health Insurance Council feels can be played by the average member of the Medical Directors Association in promoting Council objectives?

MR. HELLER — That is a rather large subject, but let me suggest a few items.

First of all, of course, there is the aid that can be given to specific Health Council projects that may be carried out in your vicinity. Passing beyond that to general considerations, I think one of the big fields in which we need assistance is in carrying on an adequate educational program in behalf of the insurance industry, with the local medical societies.

The more we see of this whole operation, the more we see how much hinges on an effective continued contact with the local practicing physicians. We have done a lot of work with the American Medical Association at national levels, and that is beneficial, but we need more assistance at the local levels.

Another important contribution is that you can keep our work realistic. You can keep the Health Council, the sales department, the underwriting department, the actuaries and the home office up to date on medical practice. We have learned a lot of things very painfully through the years that could have been told us, had we been wise enough to ask for them.

Consider for a moment the relationships between your various specialties. For example, hospitals and the medical profession do not always agree as to who is going to practice radiology or anesthesiology. All those things enter into the conduct of our business and are merely samples of dozens of things on which information could have readily been provided. There will be many more in the future.

You can help us with our surgical schedules. You can help us do our work in a fashion that adequately reflects current medical practice. I remember, for instance, one of our own company schedules where we paid the same for a simple mastectomy as we did for a radical one. They are not in the same category but we were, nonetheless, selling and paying off on some such basis as that.

You can do a great deal. Anything that you can do that will

keep the field open to the insurance industry is helpful. Now, the American Medical Association has taken a stand that is impartial and favorable to all elements who wish to follow this type of business. But you have powerful elements in the medical profession who would like to see this turn completely into a Blue Shield or Blue Cross proposition from beginning to end. Now, that is not a criticism of those organizations; they are doing a good job, but the point is that there must be effective spokesmen pointing up the need for things.

You can interpret insurance principles. Our plan of paying for surgery collides with your long-standing practice of charging according to ability to pay, which had a sound basis and was the foundation of the tremendous volume of charity work, I suppose, that the medical profession carries on and it had its origins largely in the patient's ability to pay.

If the surgical benefits provided under our policies give the policyholder a \$200 surgical benefit, and this results in a doctor performing an operation on that person who has \$200 more with which to pay his bill, and what would have been a \$200 bill becomes a \$300 bill, the basis has been taken out of the whole thing. Both the basis and the incentive for writing the insurance have been destroyed. That is just one of many segments.

One more, and I will conclude my remarks. In the matter of forms, you need to explain to doctors that in addition to the troubles of wrong kinds of forms, insurance is interwoven throughout the entire economy and that he is not going to get away from forms, but he is going to get more of them. It is easily apparent that this will not make it any more palatable to him, but it may help him understand that these benefits which flow from these forms are going to provide a very substantial share of the income in the future.

For example, consider major medical costs. Here there has been talk about one of the vulnerable points in the voluntary field. A lot of companies are issuing policies providing payments for two to ten thousand dollars, and they are at the mercy of the medical profession. Not permanently of course, but without a sympathetic and understanding view of the doctors these policies

will be withdrawn and these benefits will be provided otherwise. At the moment, it is an essential job, and we are looking to the medical profession to see its own long-term interests.

DR. FILSON — I am going to take a liberty at this point, because I think I have a question here that deserves to be answered by an individual who is not on the platform, but is in the audience. I am going to ask if I may enlarge the panel by the inclusion of Dr. William H. Scoins for this one question.

I have already stated that Dr. Scoins is the Chairman of an important Health Insurance Council Committee. That Health Insurance Council Committee goes under the heading of the Medical Liaison Committee. I have a question here which reads as follows, and it seems to refer directly to that Committee: "Is there some way, possibly through cooperative teams of physicians, actuaries and claim men, to hold meetings, possibly a panel type, on the local or county medical society level, to reach the physicians with whom we deal?"

DR. WILLIAM H. SCOINS — I would like to have the member who asked that question raise his hand. Gentlemen, we have a job before us that is going to take the concerted effort of every one of us. Now, you have heard something unfold before you today about which I learned a few months ago. I heard about this Health Insurance Council, and wondered what it was. I do not know all about it yet, and I am still learning. I do know that we have a commodity that we are offering to the public the value of which is not fully appreciated. Neither the people who are buying it nor the doctors receiving financial benefit out of the commodity fully appreciate it. It is up to somebody to explain it to them — it is up to us. We are all going to have to be missionaries in this job.

I am looking forward to this Council to provide us with information, and then later we are going to use members of this group as missionaries, I hope. We will have more missionaries to give the facts, the honest facts, to the medical profession, and in that way we shall bring about a mutual understanding. This program is going to succeed and "Uncle Sam" will not have to handle it for us.

DR. FILSON — Although we have a series of additional ques-

tions, it seems to me that I should not take advantage of your good nature too much longer.

I have one additional request to make and that is to permit me to make two or three introductions to you. You have heard much about the Health Insurance Council and you have come to realize that there are company men and staff men who are busily engaged in its operations. The two members of the panel this morning, Mr. Milliman and Mr. Heller, are busy company executives who are devoting much time and effort to the successful operations of the Health Insurance Council. There are staff men who also devote a great deal of studious effort and much time to the problems associated with its operations.

Three of those staff men are Vice-Chairmen of the Council, and I want you to meet them so that you will know who they are. I am going to exercise the privilege of introducing these three men, who, I believe, are all in the audience.

Is Mr. James Williams here? Mr. Williams, will you come up here please, so that you will be facing the audience? As I have said, he is one of the Vice-Chairmen of the Health Insurance Council, and Director of Public Relations of the Accident and Health Underwriters Conference, with headquarters located in the city of Chicago.

I know that Mr. Louis Orsini is here. This is Mr. Louis A. Orsini, who is Manager of the Group Insurance Division of the Bureau of Accident and Health Underwriters, and all of these organizations are member-organizations of the Health Insurance Council. The Bureau's headquarters are located here in New York, and Mr. Orsini is also a Vice-Chairman of the Health Insurance Council. It is a privilege to introduce him to you.

The third man whom I want to have you meet is Mr. James Andrews. Mr. Andrews has been a member of the Steering Committee, appointed by our President, to work toward the development of this panel. He is Director of Health Insurance of the Life Insurance Association of America, with which we are all familiar, and we all know that its headquarters are here in New York.

Coupling my introduction of Mr. Andrews to this audience, I am going to call upon him to outline some of the activities



which he and his associates in the Health Insurance Council are undertaking in connection with these operations about which we have been talking this morning.

MR. JAMES ANDREWS — I am not going to cover the programs because they have been adequately covered by the speakers on the panel. I do want to give you a picture of just how we break down the staff work, because you are going to see some of our faces out in different states of the union.

Mr. Orsini, whom you met, covers the northeast and also the highly industrial states of New York and Michigan. Mr. Williams covers the area from the west side of Ohio to the Rockies, which is a nice broad scope. And our association also covers the south, along with the Life Insurers Conference in Richmond, Virginia, and the west coast and Pennsylvania, New Jersey, and Ohio. Dick Ayles, who is also present, is about to leave for a meeting of the House of Delegates of the Virginia Medical Society next week. He handles all of our southern territory, and was formerly Public Relations Director of the Medical Association of Georgia. Recently we acquired Mr. Charles Peters. He will assist us in some of the other states that I mentioned previously.

DR. FILSON — Gentlemen, may I, on my own behalf as well as on behalf of my fellow panel members, express our appreciation for your patience and interest. Thank you very much.

PRESIDENT BONNETT — The program presented by this panel has demonstrated to all of us the great debt we owe to the Health Insurance Council and the big undertaking we have for the future. I want to thank you very much.

At this time, I wish to thank also all of the guest speakers who contributed to the success of this meeting. We are grateful to Dr. Horan and Dr. Williams, who talked to us this morning, and to the very able speakers we had in our previous sessions.

I would like to introduce to you, also, at the present time, your future officers. First, President-Elect Richard L. Willis, Chief Medical Director of Mutual Life.

Our new Vice-President is Dr. Ralph R. Simmons, Medical Director of the Equitable Life Insurance Company of Iowa. Dr.

Simmons has ably served the Association as Chairman of the Committee on Public and Professional Relations.

Our new Treasurer is Dr. J. Grant Irving, Medical Director of the Aetna.

As you know, Dr. Henry B. Kirkland has been re-elected Secretary and Dr. James R. Gudger has been re-elected Editor of the Proceedings.

Before presenting the new President, I want personally to thank all of those who have been so helpful in their advice, and particularly my Program Committee, consisting of Dr. Finegan of the Metropolitan, Dr. Hutchinson of the New York Life, and Dr. Pollack of the Mutual, for their very able assistance in planning and working out the details of this program. I have found, as other Presidents in the past, that our Secretary, Dr. Kirkland, is a reliable pillar of strength and a dependable guiding star.

It has been a pleasure to serve as your presiding officer for the Association's 62nd Annual Meeting. Now that the end of that meeting is at hand, I can think of nothing more satisfying than to pass on the honor and responsibility of that office to your new President.

I am sure you all know him as a very able Medical Officer of the Manufacturers Life Insurance Company of Toronto, Canada. He has served on many committees as well as on the Executive Council of your Association before becoming Vice-President and then President-Elect. He has the interests of insurance, the policyholders, and this Association very much at heart. I am pleased to present Dr. Montgomery.

DR. RICHARD C. MONTGOMERY — Thank you, Dr. Bonnett.

I want to thank you gentlemen for the high honor which you have conferred upon me in electing me President of this Association. Just about a week ago, I was looking over some of the old records and I came across an article by the late Dr. Oscar Rogers. It was in the 1907 Proceedings and was a good article on underwriting. During the course of this Association's long history, we have had many good articles as well as many good meetings. The meeting we are just concluding now certainly was a fine one and

I think Dr. Bonnett has done a splendid job for us.

Next year, as you heard from Dr. Kirkland, the meeting will be held in Toronto, Canada, and we certainly want you all to come. I believe the last meeting in Canada was held in Toronto over fifteen years ago. So we would like you to come up there. I hope the weather will be as good as it is now. The meeting will be held at about the same time of year.

Now, Mr. Secretary, is there any more business to come before the meeting?

DR. WALTER REITER — Before the close of this wonderful meeting, I would just like to ask your attention for two or three minutes.

MR. PRESIDENT — As we conclude this splendid meeting I am reminded of the closing comments and resolutions frequently submitted by our former active member, Dr. Robert Rowley. He always left us with a feeling of calmness as we paused at the close of a day's operations.

I wish time permitted me to evaluate the important role this Association has played in the life insurance industry since its beginning in 1889, 64 years ago. Its membership has always been represented by a fine group of men from the Medical Profession, headed each year by a man of outstanding ability, who has given himself unselfishly and untiringly to initiate a scientific program for the advance of life insurance medicine. In so doing, the Association has materially helped life insurance play an important part in the growth of this nation, especially in the social and health progress.

The medical profession can never be disassociated from the life, health or accident insurance field. Medical Directors have made it possible for the companies to keep abreast with the phenomenal advances in the nation's health record, adjusting and adapting its underwriting with these important upward changes.

Every meeting of the Association has brought valuable up-to-date scientific data for assimilation and adoption to our underwriting. Each convention, at its close, has seemed the superior and the best to date. I know it is the general sentiment here today

that this has been a splendid meeting. Our retiring President, Dr. Earl C. Bonnett, deserves tremendous credit and the sincere appreciation of the members for the excellent program and the constructive scientific papers that have been presented at this convention.

So we resolve that the members here assembled are deeply grateful and wish to express their appreciation to Dr. Bonnett and to his assistants in carrying through his program, to our distinguished guests in the presentation of their valuable papers and to those who have participated in the discussions. Each one has had a vital part in helping to make this convention outstanding and one to be proudly recorded in the records of the Association.

I make that as a resolution and I would like to have your expression of unanimous acceptance to be recorded in the Transactions as a tribute to our outgoing officers.

DR. MONTGOMERY — Thank you, Dr. Reiter. I am sure we all heartily approve of what Dr. Reiter said and it will be recorded in our books.

DR. ALBERT O. JIMENIS — Mr. President, another of our Officers who has served faithfully the interests of the Association and devoted much time to its affairs is now retiring from his office as Treasurer. Dr. Walter A. Reiter, Vice-President of the Mutual Benefit Life Insurance Company, has fulfilled these responsibilities for the past eight years, always with unselfish devotion and meticulous care. It is pleasant indeed to know that having been elected a member of the Executive Council this more intimate association with him will continue, and we wish at this time to express our gratitude to him by publishing this tribute in the Transactions.

DR. MONTGOMERY — Thank you, Dr. Jimenis.

Any further business, Mr. Secretary?

DR. KIRKLAND — No, sir.

DR. MONTGOMERY — I will then entertain a motion to adjourn.

## MEMBERS PRESENT

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The following doctors were present at some time during the sessions:

F. G. Agee  
C. B. Ahlefeld  
Henry Almond  
Joseph Altman  
K. W. Anderson

N. J. Barker  
S. F. Bassett  
J. R. Beard  
J. E. Bee  
M. F. Bell  
M. B. Bender  
D. M. Benford  
R. A. Benson  
R. W. Benton  
C. C. Berwick  
F. P. Bicknell  
W. R. Bishop  
J. E. Boland  
William Bolt  
E. C. Bonnett  
M. T. Boss  
J. R. Bowen  
K. F. Brandon  
D. J. Breithaupt  
H. J. Brekke  
R. D. Brewer, Jr.  
E. J. Brogan  
A. W. Bromer  
F. R. Brown  
H. B. Brown  
Leslie Brown  
R. F. Brown  
J. S. Butterworth

R. L. Candage  
R. B. Cleveland  
M. H. Clifford  
N. B. Cole  
B. R. Comeau  
F. R. Congdon  
J. L. Cook  
L. H. Costigan

H. D. Delamere  
P. G. Denker  
E. G. Dewis  
W. S. Dietrich  
F. R. Dieuaidé  
A. H. Domm  
J. P. Donelan  
G. D. Dorman  
L. B. Dunn

L. H. Earle, Jr.  
L. B. Ellis  
J. C. Emmett

A. H. Faber  
J. G. Falconer  
R. K. Farnham  
H. H. Fellows  
R. M. Filson  
R. W. Finegan  
G. E. Fort  
H. M. Frost

F. I. Ganot  
D. S. Garner  
J. H. Geddes  
J. T. Geiger  
W. M. Genthner  
E. E. Getman  
O. G. Goldkamp  
R. A. Goodell  
George Goodkin  
H. W. Goos  
J. K. Gordon  
C. D. Gossage  
A. S. Graham  
G. M. Graham  
A. E. Gras  
Ghent Graves  
R. S. Gubner  
J. R. Gudger

Llewellyn Hall  
G. W. Halpenny  
T. H. Ham  
E. C. Hammond  
V. G. Hammond  
A. H. Hansen  
L. E. Hathaway, Jr.  
H. L. Hauge  
M. H. Henderson  
O. C. Hendrix  
H. H. Hershey  
E. V. Higgins  
E. C. Hillman, Jr.  
D. W. Hoare  
J. C. Horan  
E. G. Howe  
T. B. Hoxie  
H. W. Hudson  
A. A. Humphrey  
J. H. Humphries  
B. L. Huntington  
J. J. Hutchinson  
J. R. B. Hutchinson

A. S. Irving  
J. G. Irving

A. O. Jimenis  
W. W. S. Johnston

J. R. Karns  
V. L. Karren  
E. A. Keenleyside  
N. R. Kelley  
E. F. Kerby  
N. C. Kiefer  
C. E. Kiessling  
D. G. Kilgore  
Richard King  
C. T. Kirchmaier  
H. B. Kirkland  
Paul Kurzweg

Phillips Lambkin  
P. H. Langner, Jr.  
L. G. LaPointe  
A. L. Larson  
I. C. Lawler  
A. E. Lee  
H. R. Leffingwell  
W. R. Leute, Jr.  
E. H. Lindstrom  
J. F. Lovejoy  
G. J. Lunz

F. M. McChesney  
George McCreight  
H. M. McCue, Jr.  
William MacDonald  
A. J. McGanity  
F. J. McGurl  
T. J. McGurl, Jr.  
George McLean  
L. L. McLellan  
Charles Maertz  
H. R. Magee  
Morton Magiday  
S. J. N. Magwood  
John Malgieri  
F. A. L. Mathewson  
E. M. Medlar  
L. K. Meredith  
H. C. Miller  
L. C. Miller  
M. B. Miller  
J. T. Montgomery  
R. C. Montgomery  
J. F. Moore, Jr.  
J. R. E. Morden  
C. V. Mulligan  
Luiz Murgel

S. A. Narins  
M. H. Neill  
R. E. Nicholson  
E. C. Noble

A. J. Oberlander  
R. E. O'Connor  
R. J. Oehrig  
W. F. H. O'Neill  
J. K. T. Ormrod

C. B. Parker  
A. E. Parks  
J. M. Peck  
D. S. Pepper  
H. M. Pequegnat  
G. S. Pesquera  
C. A. Peters  
R. W. Peterson  
J. C. Pierson  
Cullen Pitt  
T. E. Plucinski  
A. A. Pollack  
R. W. Pratt  
R. S. A. Purkis  
M. A. Puzak

O. S. Randall  
C. L. Reeder  
P. V. Reinartz  
W. A. Reiter  
W. M. Reynolds  
G. P. Robb  
D. C. Roberts  
A. J. Robinson  
J. C. Robinson  
R. C. Roskelley  
J. G. Ross

T. F. Ross  
W. W. Rucks  
N. E. Ruud  
M. T. Ryman

D. Y. Sage  
K. F. Schaefer  
L. P. Schroeder  
P. G. Schwager  
B. T. D. Schwarz  
W. H. Scoins  
R. C. Secor  
A. F. Seibert  
D. L. Selby  
J. T. Sheridan  
R. R. Simmons  
H. N. Simpson  
R. B. Singer  
W. A. Smith  
D. M. Spain  
F. L. Springer  
F. J. Stare  
H. F. Starr  
F. R. Stearns  
J. B. Steele  
J. W. Stickney  
D. F. R. Steuart  
E. M. Stevenson  
H. M. Stevenson  
S. J. Streight

J. C. Talbot  
M. J. Taylor

L. J. Tedesco  
G. F. Tegtmeier  
K. J. Thomson  
W. B. Thornton  
Joseph Travenick, Jr.  
F. D. Truax

H. E. Ungerleider

B. W. Vale  
A. E. Venables  
R. C. Voss

P. C. Waldo  
K. K. Wallace  
R. V. Ward  
F. A. Warner  
C. F. Warren  
R. L. Weaver  
Jefferson Weed  
J. L. Weinstock  
P. V. Wells  
S. S. Werth  
G. M. Wheatley  
J. A. Wilhelm  
E. S. Williams  
R. L. Willis  
A. C. Wilson  
G. E. Woodford

L. S. Ylvisaker  
V. H. Young

A. F. Zipf  
M. C. Ziporyn

Also present were:

James Andrews, Jr.  
W. A. Canfield  
F. T. Crawley

R. T. Heller

Edward King

A. E. Lagergren  
E. A. Lew

H. H. Marks  
W. P. Marshall  
W. A. Milliman  
A. P. Morton

G. A. Oliver  
L. A. Orsini

L. N. Parker

O. G. Sherman

C. A. Siegfried  
D. G. Stock  
W. M. Stufflebeem

J. F. Tenny  
A. E. Thyselius

A. C. Webster  
J. C. Wilberding  
J. R. Williams  
J. F. Wilson  
A. A. Windecker

Total attendance at all sessions, 276.

## **In Memoriam**

### **Deceased since Sixty-first Annual Meeting**

J. Rozier Biggs, M. D.  
Peoples Life Insurance Company, Washington, D. C.  
Died December 18, 1952

George E. Kanouse, M. D.  
The Prudential Insurance Company of America  
Died November 13, 1952

Claude A. Robison, M. D.  
Peoples Life Insurance Company, Frankfort, Ind.  
Died February 2, 1953

Nathaniel P. Doak, M. D.  
Great Southern Life Insurance Company  
Died April 20, 1953

David E. W. Wenstrand, M. D.  
The Northwestern Mutual Life Insurance Company  
Died June 4, 1953

# LIST OF MEMBERS OF THE ASSOCIATION OF LIFE INSURANCE MEDICAL DIRECTORS OF AMERICA

Charles B. Ahlefeld, M. D.	Business Men's, Kansas City, Mo.
Henry Almond, M. D.	Metropolitan, New York City
Joseph Altman, M. D.	Companion Life, New York City
Henry H. Amsden, M. D.	United Life and Accident, Concord, N. H.
E. A. Anderson, M. D.	Modern Woodmen, Rock Island, Ill.
Frank R. Anderson, M. D.	Pacific Mutual, Los Angeles, Calif.
Karl W. Anderson, M. D.	Northwestern National, Minneapolis, Minn.
Perry A. Anderson, M. D.	Rockford Life, Rockford, Ill.
Thomas M. Armstrong, M. D.	Philadelphia Life, Philadelphia, Pa.
William B. Aten, M. D.	Columbian Mutual, Binghamton, N. Y.
Donald R. Auten, M. D.	New York Life, New York City
Bernard Baillargeon, M. D.	Alliance Nationale, Montreal, Canada
G. Holbrook Barber, M. D.	Manhattan, New York City
Norman J. Barker, M. D.	Connecticut General, Hartford, Conn.
Gordon P. Barnett, M. D.	Kansas City Life, Kansas City, Mo.
Charles M. Barrett, M. D.	Western and Southern, Cincinnati, Ohio
Samuel F. Bassett, M. D.	Prudential, Newark, N. J.
Daniel S. Baughman, M. D.	Security Life and Accident, Denver, Colo.
Carroll C. Beach, M. D.	State Mutual, Worcester, Mass.



## LIST OF MEMBERS

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Eliot F. Beach, Ph. D.	Metropolitan, New York City
J. Randolph Beard, M. D.	Mutual Benefit, Newark, N. J.
James E. Bee, M. D.	Kansas City Life, Kansas City, Mo.
Roland A. Behrman, M. D.	John Hancock Mutual, Boston, Mass.
Murray F. Bell, M. D.	New York Life, New York City
Maurice B. Bender, M. D.	Guardian, New York City
David M. Benford, M. D.	Metropolitan, New York City
Robert A. Benson, M. D.	Metropolitan, Ottawa, Canada
Roy W. Benton, M. D.	Northwestern Mutual, Milwaukee, Wis.
C. Coleman Berwick, M. D.	Metropolitan, San Francisco, Calif.
Francis P. Bicknell, M. D.	State Mutual, Worcester, Mass.
B. Cosby Bird, M. D.	Preferred, Montgomery, Ala.
William R. Bishop, M. D.	Provident Life Acc., Chatta- nooga, Tenn.
John E. Boland, M. D.	Country, Chicago, Ill.
William Bolt, M. D.	New York Life, New York City
John M. Bond, M. D.	Northwestern Mutual, Milwaukee, Wis.
Earl C. Bonnett, M. D.	Metropolitan, New York City
Charles M. Bonzey, Jr., M. D.	United States Life, New York City
M. Theodore Boss, M. D.	Home Friendly, Baltimore, Md.
John R. Bowen, M. D.	Penn Mutual, Philadelphia, Pa.
J. Thornley Bowman, M. D.	London Life, London, Canada
Ernest L. Boylen, M. D.	Standard, Portland, Ore.

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William E. Branch, M. D.	Constitution Life, Los Angeles, Calif.
Kenneth F. Brandon, M. D.	Aetna, Hartford, Conn.
David J. Breithaupt, M. D.	Manufacturers, Toronto, Canada
Harvey J. Brekke, M. D.	Lutheran Brotherhood, Minneapolis, Minn.
Robert D. Brewer, M. D.	State Mutual, Worcester, Mass.
Albert W. Bromer, M. D.	Metropolitan, New York City
C. Frank Brown, M. D.	Southwestern, Dallas, Tex.
Frederick R. Brown, M. D.	New England Mutual, Boston, Mass.
Howard B. Brown, M. D.	Massachusetts Mutual, Springfield, Mass.
Leslie Brown, M. D.	Equitable Life Assurance, New York City
Ronald F. Buchan, M. D.	Prudential, Newark, N. J.
Benjamin F. Byrd, M. D.	National Life & Accident, Nashville, Tenn.
Joseph T. Cabaniss, M. D.	Travelers, Hartford, Conn.
D. Allan Campbell, M. D.	Bankers, Lincoln, Neb.
Edward J. Campbell, M. D.	New York Life, New York City
Hugh B. Campbell, M. D.	Phoenix Mutual, Hartford, Conn.
Raymond L. Candage, M. D.	John Hancock Mutual, Boston, Mass.
David W. Carter, Jr., M. D.	Reserve Life, Dallas, Tex.
John P. Chapman, M. D.	Pennsylvania Life, Health & Accident, Philadelphia, Pa.
Paul H. Charlton, M. D.	Midland Mutual, Columbus, Ohio
Edmund D. Chesebro, M. D.	Puritan, Providence, R. I.

## LIST OF MEMBERS

283

- Harry E. Christensen, M. D. Union Mutual, Portland, Me.
- Robert B. Cleveland, M. D. Equitable Life Assurance,  
New York City
- Milton H. Clifford, M. D. New England Mutual, Boston,  
Mass.
- Harry A. Cochran, Jr., M. D. Lincoln National, Fort Wayne,  
Ind.
- Norman B. Cole, M. D. Baltimore Life, Baltimore, Md.
- Irwin E. Colgin, M. D. Texas Life, Waco, Tex.
- G. R. Collyer, M. D. London Life, London, Canada
- Harry L. Colombo, M. D. National Life, Montpelier, Vt.
- Frederick R. Congdon, M. D. Berkshire, Pittsfield, Mass.
- J. Lindsay Cook, M. D. Pilot, Greensboro, N. C.
- Neil L. Criss, M. D. United Benefit, Omaha, Neb.
- Howard K. Crutcher, M. D. United Fidelity, Dallas, Tex.
- Khurshed J. J. Cursetji, M. D. Oriental Government Security  
Life, Bombay, India
- Bryan A. Dawber, M. D. Penn Mutual, Philadelphia, Pa.
- John S. Delahaye, M. D. Empire Life, Kingston, Canada
- Harold D. Delamere, M. D. Crown, Toronto, Canada
- Aniceto Del Rio, M. D. La Nacional, Mexico City,  
Mexico
- Ernest J. Dewees, M. D. Provident Mutual,  
Philadelphia, Pa.
- Earle T. Dewey, M. D. Metropolitan, San Francisco,  
Calif.
- Edwin G. Dewis, M. D. Prudential, Newark, N. J.
- Edward S. Dillon, M. D. Penn Mutual, Philadelphia,  
Pa.

Harry W. Dingman, M. D.	Continental Assurance, Chicago, Ill.
Albert H. Domm, M. D.	Prudential, Los Angeles, Calif.
James P. Donelan, M. D.	Guarantee Mutual, Omaha, Neb.
Gerald D. Dorman, M. D.	New York Life, New York City
James T. Downs, Jr., M. D.	Fidelity Union, Dallas, Tex.
Raymond L. Dross, M. D.	Prudential, Houston, Tex.
Thomas C. Dunlop, M. D.	Manufacturers, Toronto, Canada
Louis B. Dunn, M. D.	Postal, New York City
William W. Eakin, M. D.	Standard, Montreal, Canada
Lyon H. Earle, Jr., M. D.	Connecticut General, Hartford, Conn.
Theodore M. Ebers, M. D.	Connecticut Mutual, Hartford, Conn.
H. Glenn Ebersole, M. D.	Central Standard, Monmouth, Ill.
Laurence B. Ellis, M. D.	Boston Mutual, Boston, Mass.
James C. Emmett, M. D.	Imperial, Toronto, Canada
Jack A. End, M. D.	Northwestern Mutual, Milwaukee, Wis.
Albert H. Faber, M. D.	New York Life, New York City
J. Gilbert Falconer, M. D.	North American, Toronto, Canada
Raymond K. Farnham, M. D.	Metropolitan, New York City
Haynes H. Fellows, M. D.	Metropolitan, New York City
William S. Fewell, M. D.	Liberty, Greenville, S. C.
Ralph M. Filson, M. D.	Travelers, Hartford, Conn.

# LIST OF MEMBERS

285

Rexford W. Finegan, M. D.	Metropolitan, New York City
Harry E. Flansburg, M. D.	Bankers, Lincoln, Neb.
Philip M. L. Forsberg, M. D.	United Life and Accident, Concord, N. H.
Garth E. Fort, M. D.	National Life & Accident, Nashville, Tenn.
John M. Foster, M. D.	Capitol, Denver, Colo.
Edward M. Freeland, M. D.	New York Life, New York City
Clarence E. Fronk, M. D.	Hawaiian Life, Honolulu, T. H.
Robert E. Funke, M. D.	Prudential, Los Angeles, Calif.
F. Irving Ganot, M. D.	Prudential, Newark, N. J.
I. Kenneth Gardner, M. D.	Lincoln National, Ft. Wayne, Ind.
David S. Garner, M. D.	Shenandoah, Roanoke, Va.
J. H. Geddes, M. D.	Northern, London, Canada
John T. Geiger, M. D.	Metropolitan, New York City
John P. Gemmel, M. D.	Monarch, Winnipeg, Canada
William M. Genthner, M. D.	Continental American, Wilmington, Del.
Edson E. Getman, M. D.	New York Life, New York City
Edgar G. Givhan, Jr., M. D.	Protective, Birmingham, Ala.
Otto G. Goldkamp, M. D.	Connecticut General, Hartford, Conn.
Robert A. Goodell, M. D.	Phoenix Mutual, Hartford, Conn.
George Goodkin, M. D.	Equitable Life Assurance, New York City
Harold M. Goodman, M. D.	Home Beneficial, Richmond, Va.
Harry W. Goos, M. D.	Home, Philadelphia, Pa.

J. Keith Gordon, M. D.	Sun, Montreal, Canada
Charles D. Gossage, M. D.	Confederation, Toronto, Canada
Angus S. Graham, M. D.	London Life, London, Canada
George M. Graham, M. D.	Lincoln National, Fort Wayne, Ind.
Albert E. Gras, M. D.	Prudential, Newark, N. J.
Ghent Graves, M. D.	American General, Houston, Tex.
Harris M. Gray, M. D.	Manufacturers, Toronto, Canada
Floyd M. Green, M. D.	Columbus Mutual, Columbus, Ohio
George E. Greenway, M. D.	Western Life Assurance, Hamilton, Canada
C. J. M. Grisdale, M. D.	Connecticut General, Hartford, Conn.
Frederick O. Gronvold, M. D.	Pioneer Mutual, Fargo, N. D.
Richard S. Gubner, M. D.	Equitable Life Assurance, New York City
James R. Gudger, M. D.	Mutual, New York City
Van W. Gunter, M. D.	Jefferson Standard, Greensboro, N. C.
Milton W. Gwinner, M. D.	Western and Southern, Cincinnati, Ohio
Llewellyn Hall, M. D.	Phoenix Mutual, Hartford, Conn.
F. Tulley Hallam, M. D.	Bankers, Des Moines, Iowa
John H. Halliday, M. D.	Australian Mutual, Sydney Australia
Gerald W. Halpenny, M. D.	Royal, Montreal, Canada
Vincent G. Hammond, M. D.	Security Mutual, Binghamton, N. Y.
Ottis E. Hanes, M. D.	Life Ins. Co. of Ga., Atlanta, Ga.

John A. A. Harcourt, M. D.	Toronto Mutual, Toronto, Canada
Garland M. Harwood, M. D.	Life Insurance Co. of Virginia, Richmond, Va.
Louis E. Hathaway, Jr., M. D.	Monarch, Springfield, Mass.
Howard L. Hauge, M. D.	New York Life, New York City
Walter C. Hausheer, M. D.	Prudential, Newark, N. J.
Harry M. Hawkins, M. D.	Old Line, Milwaukee, Wis.
Thomas L. Hawkins, M. D.	Western, Helena, Mont.
J. Harry Hayes, M. D.	Union, Little Rock, Ark.
Milton H. Henderson, M. D.	Excelsior, Toronto, Canada
Olin C. Hendrix, M. D.	New England Mutual, Boston, Mass.
William A. Henry, M. D.	Franklin, Springfield, Ill.
Ivan C. Heron, M. D.	West Coast, San Francisco, Calif.
William D. Hickerson, M. D.	Union Central, Cincinnati, Ohio
Eugene V. Higgins, M. D.	North American Reassurance, New York City
Ernest C. Hillman, Jr., M. D.	Mutual Benefit, Newark, N. J.
Daniel W. Hoare, M. D.	Penn Mutual, Philadelphia, Pa.
Joseph C. Horan, M. D.	Metropolitan, New York City
Arnold B. Houston, M. D.	Great-West, Winnipeg, Canada
Edward G. Howe, M. D.	Prudential, Newark, N. J.
Thomas B. Hoxie, M. D.	New York Life, New York City
Henry W. Hudson, M. D.	Loyal Protective, Boston, Mass.
Gene I. Hull, M. D.	Bankers, Des Moines, Iowa
Arthur A. Humphrey, M. D.	Federal Life and Casualty, Battle Creek, Mich.

- |                                    |   |
|------------------------------------|---|
| John L. Humphreys, M. D.           | Lincoln National, Ft. Wayne,<br>Ind.                |
| James H. Humphries, M. D.          | Home, New York City                                 |
| J. Edward Hunsinger, M. D.         | Republic Nat'l, Dallas, Tex.                        |
| Benjamin L. Huntington,<br>M. D.   | John Hancock Mutual, Boston,<br>Mass.               |
| Samuel W. Hurdle, M. D.            | Security Life & Trust,<br>Winston-Salem, N. C.      |
| John J. Hutchinson, M. D.          | New York Life,<br>New York City                     |
| J. Raymond B. Hutchinson,<br>M. D. | Acacia Mutual, Washington,<br>D. C.                 |
| Albert S. Irving, M. D.            | Commonwealth, Louisville,<br>Ky.                    |
| J. Grant Irving, M. D.             | Aetna, Hartford, Conn.                              |
| Tsugitake Isshiki, M. D.           | Asahi Mutual, Tokyo, Japan                          |
| Samuel Jagoda, M. D.               | State Reserve, Fort Worth,<br>Tex.                  |
| Albert O. Jimenis, M. D.           | Metropolitan, New York City                         |
| Hubert R. John, M. D.              | Maccabees, Detroit, Mich.                           |
| Joseph W. Johnson, Jr., M. D.      | Interstate Life and Accident,<br>Chattanooga, Tenn. |
| Alfred Kahn, Jr., M. D.            | National Equity, Little Rock,<br>Ark.               |
| Victor L. Karren, M. D.            | Home, New York City                                 |
| Edward A. Keenleyside, M. D.       | Prudential, Toronto, Canada                         |
| Frank J. Kefferstan, II, M. D.     | John Hancock Mutual, Boston,<br>Mass.               |
| Charles H. Kelley, M. D.           | Columbian National, Boston,<br>Mass.                |
| Newell R. Kelley, M. D.            | Phoenix Mutual, Hartford,<br>Conn.                  |
| Herbert B. Kennedy, M. D.          | Woodmen of the World,<br>Omaha, Neb.                |



## LIST OF MEMBERS

289

William F. Ketchum, M. D.	New England Mutual, Boston, Mass.
Harry B. Kidd, M. D.	Metropolitan, Ottawa, Canada
Norvin C. Kiefer, M. D.	Equitable Life Assurance, New York City
Charles E. Kiessling, M. D.	Prudential, Newark, N. J.
Donald G. Kilgore, M. D.	Republic National, Dallas, Tex.
Richard King, M. D.	Family Fund, Atlanta, Ga.
Carl T. Kirchmaier, M. D.	Life & Casualty, Nashville, Tenn.
Henry B. Kirkland, M. D.	Prudential, Newark, N. J.
Norman L. Knott, M. D.	Prudential, Los Angeles, Calif.
Edward Kuck, M. D.	Union Central, Cincinnati, Ohio
Paul Kurzweg, Jr., M. D.	All American Assurance, Lafayette, La.
Walter C. Lamb, M. D.	Equitable Life Assurance, New York City
Phillips Lambkin, M. D.	Guardian, New York City
Paul H. Langner, Jr., M. D.	Provident Mutual, Philadelphia, Pa.
L. Gordon LaPointe, M. D.	Manhattan Life, New York City
H. Franklyn Laramore, M. D.	Connecticut Mutual, Hartford, Conn.
Albert L. Larson, M. D.	Travelers, Hartford, Conn.
Ivan C. Lawler, M. D.	New York Life, New York City
Linford H. Lee, M. D.	Pacific Mutual, Los Angeles, Calif.
James M. Leffel, M. D.	Empire L. & A., Indianapolis Ind.
Harold R. Leffingwell, M. D.	Paul Revere, Worcester, Mass.

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- |                                |   |
|--------------------------------|---|
| William R. Leute, Jr., M. D.   | Penn Mutual, Philadelphia, Pa.                                |
| T. Herbert Lewis, M. D.        | Western States, Fargo, N. D.                                  |
| Janus C. Lindner, M. D.        | Prudential, Minneapolis, Minn.                                |
| Everett H. Lindstrom, M. D.    | Western, Helena, Mont.  |
| James A. Livingston, M. D.     | Liberty National, Birmingham,<br>Ala.                         |
| Gladstone W. Loughheed, M. D.  | Confederation, Toronto,<br>Canada                             |
| John F. Lovejoy, M. D.         | United Life, Jacksonville, Fla.                               |
| Cabot Lull, M. D.              | American, Birmingham, Ala.                                    |
| Gerald J. Lunz, M. D.          | Knights of Columbus,<br>New Haven, Conn.                      |
|                                |   |
| Frank M. McChesney, M. D.      | Equitable, Washington, D. C.                                  |
| William J. McConnell, M. D.    | Metropolitan, New York City                                   |
| George McCreight, M. D.        | Bankers, Des Moines, Iowa                                     |
|                                |   |
| Howard M. McCue, Jr., M. D.    | Life Insurance Co. of Virginia,<br>Richmond, Va.              |
| William MacDonald, M. D.       | Teachers Insurance &<br>Annuity Association,<br>New York City |
| Arthur J. McGanity, M. D.      | Dominion, Waterloo, Canada                                    |
| J. David McGaughey, III, M. D. | Connecticut General, Hartford,<br>Conn.                       |
| Frank J. McGurl, M. D.         | Prudential, Houston, Tex.                                     |
| Thomas J. McGurl, Jr., M. D.   | Mutual, New York City   |
| Charles D. McKeown, M. D.      | Farmers & Bankers, Wichita,<br>Kan.                           |
| William G. McLaughry, M. D.    | Protected Home Circle,<br>Sharon, Pa.                         |
| George McLean, M. D.           | Sun, Baltimore, Md.   |

## LIST OF MEMBERS

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Lawrence L. McLellan, M. D.	Provident Mutual, Philadelphia, Pa.
Ralph E. McLochlin, M. D.	National Old Line, Little Rock, Ark.
William J. McNamara, M. D.	Equitable Life Assurance, New York City
Charles Maertz, M. D.	Union Central, Cincinnati, Ohio
Charles D. Magee, M. D.	Missouri Insurance Company, St. Louis, Mo.
S. J. Newton Magwood, M. D.	Continental, Toronto, Canada
John Malgieri, M. D.	New York Life, New York City
Francis A. L. Mathewson, M. D.	Great-West, Winnipeg, Canada
Loren K. Meredith, M. D.	National, Des Moines, Iowa
Ignacio Mesa, M. D.	"La Latino-Americana", Mexico City, Mexico
Ernest B. Milan, M. D.	Peninsular, Jacksonville, Fla.
Lloyd C. Miller, M. D.	National Life & Accident, Nashville, Tenn.
Milton B. Miller, M. D.	Victory Life, Topeka, Kan.
Edward S. Mills, M. D.	Prudential Assurance, Montreal, Canada
Eugene Montgomery, M. D.	North American, Toronto, Canada
Richard C. Montgomery, M. D.	Manufacturers, Toronto, Canada
John F. Moore, Jr., M. D.	Mutual, New York City
Samuel R. Moore, M. D.	Provident Mutual, Philadelphia, Pa.
J. R. E. Morden, M. D.	Massachusetts Mutual, Springfield, Mass.
Reuben A. Moser, M. D.	American Reserve, Omaha Neb.
J. Palmer Moss, M. D.	Columbian Mutual, Memphis, Tenn.
Bernard Mount, M. D.	All States, Montgomery, Ala.
Elmer B. Mountain, M. D.	American Mutual, Des Moines, Iowa
Clifford V. Mulligan, M. D.	T. Eaton, Toronto, Canada

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Frederick D. Munroe, M. D.	Fidelity, Regina, Canada
Luiz Murgel, M. D.	Companhia Internacional, Rio de Janeiro, Brazil
George H. Murphy, M. D.	Maritime, Halifax, Canada
Sidney A. Narins, M. D.	Mutual, New York City
Richard M. Nay, M. D.	Indianapolis Life, Indianapolis, Ind.
Mather H. Neill, M. D.	Aetna, Hartford, Conn.
Clive P. Neilson, M. D.	Sovereign Life, Winnipeg, Canada
Richard A. Nelson, M. D.	Prudential, Jacksonville, Fla.
John B. Nichols, M. D.	Acacia Mutual, Washington, D. C.
Richard E. Nicholson, M. D.	Connecticut Mutual, Hartford, Conn.
E. Clark Noble, M. D.	National, Toronto, Canada
Andrew J. Oberlander, M. D.	Prudential, Chicago, Ill.
William L. O'Connell, M. D.	Union Labor, New York City
Robert D. O'Connor, M. D.	Old Line, Milwaukee, Wis.
Denis J. O'Leary, M. D.	New York Life, New York City
Martin I. Olsen, M. D.	Central, Des Moines, Iowa
William F. H. O'Neill, M. D.	Franklin, Springfield, Ill.
John K. T. Ormrod, M. D.	Aetna, Hartford, Conn.
Wilbert C. Page, M. D.	Prudential, Newark, N. J.
Charles B. Parker, M. D.	Independent Order of Foresters, Toronto, Canada

## LIST OF MEMBERS

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Arthur E. Parks, M. D.	Canada Life, Toronto, Canada
John S. Pearson, M. D.	John Hancock Mutual, Boston, Mass.
John M. Peck, M. D.	Fidelity Mutual, Philadelphia, Pa.
D. Sergeant Pepper, M. D.	Connecticut Mutual, Hartford, Conn.
Homer M. Pequegnat, M. D.	Dominion, Waterloo, Canada
Gilberto S. Pesquera, M. D.	Metropolitan, New York City
Charles A. Peters, M. D.	Prudential Assurance, Montreal, Canada
Ray W. Peterson, M. D.	Columbian Mutual, Binghamton, N. Y.
Cullen Pitt, M. D.	Atlantic, Richmond, Va.
Theodore E. Plucinski, M. D.	Mutual, New York City
Albert A. Pollack, M. D.	Mutual, New York City
Roscoe W. Pratt, M. D.	New York Life, New York City
William O. Purdy, M. D.	Equitable, Des Moines, Iowa
Raymond S. A. Purkis, M. D.	Canada Life, Toronto, Canada
Michael A. Puzak, M. D.	Peoples, Washington, D. C.
Louis A. Pyle, M. D.	Colonial, East Orange, N. J.
O. Samuel Randall, M. D.	Midland National, Watertown, S. D.
Paul M. Rattan, M. D.	Great National, Dallas, Tex.
James H. Ready, M. D.	General American, St. Louis, Mo.
Rezin Reagan, M. D.	National Reserve, Sioux Falls, S. D.
Clifton L. Reeder, M. D.	Continental Assurance, Chicago, Ill.
Paul V. Reinartz, M. D.	Prudential, Jacksonville, Fla.

Walter A. Reiter, M. D.	Mutual Benefit, Newark, N. J.
Whitman M. Reynolds, M. D.	Equitable Life Assurance, New York City
H. Guy Riche, M. D.	Guaranty Income, Baton Rouge, La.
Donald F. Rikkers, M. D.	Northwestern Mutual, Milwaukee, Wis.
George P. Robb, M. D.	Metropolitan, New York City
David C. Roberts, M. D.	Guardian, New York City
Albert J. Robinson, M. D.	Connecticut General, Hartford, Conn.
John C. Robinson, M. D.	Travelers, Hartford, Conn.
Van C. Robinson, M. D.	American Mutual, Des Moines, Iowa
Henry B. Rollins, M. D.	Connecticut Mutual, Hartford, Conn.
Gordon Ross, M. D.	Massachusetts Mutual, Springfield, Mass.
John G. Ross, M. D.	Mutual, Waterloo, Canada
Thomas F. Ross, M. D.	Ohio State, Columbus, Ohio
Edward W. Rowe, M. D.	Midwest, Lincoln, Neb.
William W. Rucks, M. D.	Home State, Oklahoma City, Okla.
John K. Ruggles, Jr., M. D.	Paul Revere, Worcester, Mass.
Merlin T. Ryman, M. D.	Mutual Benefit, Newark, N. J.
Dan Y. Sage, M. D.	Southern, Atlanta, Ga.
John L. Saia, M. D.	National, Montpelier, Vt.
Joe H. Sanderlin, M. D.	Pyramid, Little Rock, Ark.
Royal S. Schaaf, M. D.	Prudential, Newark, N. J.
Raymond C. Scannell, M. D.	Security Life and Accident, Denver, Colo.

## LIST OF MEMBERS

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Kenneth F. Schaefer, M. D.	Prudential, Minneapolis, Minn.
Paul G. Schwager, M. D.	Equitable, Waterloo, Canada
Berthold T. D. Schwarz, M. D.	Bankers National, Montclair, N. J.
William H. Scoins, M. D.	Lincoln National, Ft. Wayne, Ind.
Robert J. Scott, M. D.	Michigan Life, Detroit, Mich.
Ralph C. Secor, M. D.	Liberty National, Birmingham, Ala.
Alfred F. Seibert, M. D.	Travelers, Hartford, Conn.
David L. Selby, M. D.	Imperial, Toronto, Canada
Thomas S. Sexton, M. D.	Massachusetts Mutual, Springfield, Mass.
Hall Shannon, M. D.	Southland, Dallas, Tex.
Elroy F. Sheldon, M. D.	Occidental, Los Angeles, Calif.
Joyce T. Sheridan, M. D.	Fidelity Mutual, Philadelphia, Pa.
Hubert H. Shook, M. D.	Ohio National, Cincinnati, Ohio
Ralph R. Simmons, M. D.	Equitable, Des Moines, Iowa
Howard N. Simpson, M. D.	Monarch Life, Springfield, Mass.
Jonathan C. Sinclair, M. D.	Canada Life, Toronto, Canada
Richard B. Singer, M. D.	New England Mutual, Boston, Mass.
Beecher W. Sitterson, M. D.	Ohio National, Cincinnati, Ohio
F. Hartley Smith, M. D.	Great-West, Winnipeg, Canada
Stewart A. Smith, M. D.	Australian Mutual, Sydney, Australia
Wilbur A. Smith, M. D.	Equitable Life Assurance, New York City
Frederick A. Snyder, M. D.	Western and Southern, Cincinnati, Ohio
Isaac Sossnitz, M. D.	Eastern, New York City

Marion Souchon, M. D.	Pan-American, New Orleans, La.
Charles G. Spivey, M. D.	Carolina Life, Columbia, S. C.
Frank L. Springer, M. D.	Columbian National, Boston, Mass.
H. Frank Starr, M. D.	Jefferson Standard, Greensboro, N. C.
F. R. Stearns, M. D.	Security Benefit, Topeka, Kan.
George G. Stebbins, M. D.	Wisconsin Life, Madison, Wis.
John B. Steele, M. D.	Volunteer State, Chattanooga, Tenn.
David F. R. Steuart, M. D.	Mutual Benefit, Newark, N. J.
Edgar M. Stevenson, M. D.	State Farm, Bloomington, Ill.
Hector M. Stevenson, M. D.	Aetna, Hartford, Conn.
Lester Q. Stewart, M. D.	Aetna, Hartford, Conn.
Frank M. Stites, M. D.	Kentucky Home Mutual, Louisville, Ky.
John C. Talbot, M. D.	Pacific Mutual, Los Angeles, Calif.
Joseph L. Tansey, M. D.	John Hancock Mutual, Boston, Mass.
Louis J. Tedesco, M. D.	New York Life, New York City
Gamber F. Tegtmeier, M. D.	Northwestern Mutual, Milwaukee, Wis.
Edward R. Thompson, M. D.	Texas Prudential, Galveston, Tex.
K. Jefferson Thomson, M. D.	Metropolitan, New York City
William B. Thornton, M. D.	Norwich Union, Toronto, Canada
Joel E. Toothaker, M. D.	Sunset Life, Olympia, Wash.
Albert R. Tormey, M. D.	National Guardian, Madison, Wis.
Grafton D. Townshend, M. D.	Standard Life Association, Lawrence, Kan.



## LIST OF MEMBERS

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Joseph Travenick, Jr., M. D.	Occidental, Los Angeles, Calif.
Sophie C. Trent, M. D.	Connecticut General, Hartford, Conn.
Wallace Troup, M. D.	Metropolitan, Ottawa, Canada
Francis D. Truax, M. D.	Crown, Toronto, Canada
Maurice Turcotte, M. D.	Industrial, Quebec, Canada
Harry E. Ungerleider, M. D.	Equitable Life Assurance, New York City
Bruce W. Vale, M. D.	Excelsior, Toronto, Canada
Euen Van Kleeck, M. D.	Travelers, Hartford, Conn.
Alexander E. Venables, M. D.	Minnesota Mutual, St. Paul, Minn.
Frederick H. Vinup, M. D.	Monumental, Baltimore, Md.
Reynold C. Voss, M. D.	Pan-American, New Orleans, La.
Proctor C. Waldo, M. D.	Washington National, Evanston, Ill.
George H. Walker, M. D.	Lincoln Liberty, Lincoln, Neb.
Dick P. Wall, M. D.	American National, Galveston, Tex.
Gordon K. Wallace, M. D.	Great American Reserve, Dallas, Tex.
Kenneth E. Ward, M. D.	Connecticut General, Hartford, Conn.
R. Vance Ward, M. D.	Montreal Life, Montreal, Canada
Frank A. Warner, M. D.	John Hancock Mutual, Boston, Mass.
Robert L. Weaver, M. D.	Penn Mutual, Philadelphia, Pa.
Jefferson Weed, M. D.	Mutual Benefit, Newark, N. J.

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John A. Wilhelm, M. D.	Gulf, Jacksonville, Fla.
Alfred A. Willander, M. D.	Mutual Trust, Chicago, Ill.
Earl B. Williams, M. D.	Wisconsin National, Oshkosh, Wis.
Ennion S. Williams, M. D.	Life Insurance Co. of Virginia, Richmond, Va.
Richard L. Willis, M. D.	Mutual, New York City
Archibald C. Wilson, M. D.	Connecticut General, Hartford, Conn.
C. L. Wilson, M. D.	Empire State Mutual, Jamestown, N. Y.
Don J. Wolfram, M. D.	Jefferson National, Indianapolis, Ind.
George E. Woodford, M. D.	Home, New York City
Donald H. Woodhouse, M. D.	Sun, Montreal, Canada
Lauritz S. Ylvisaker, M. D.	Fidelity Mutual, Philadelphia, Pa.
Donald E. Yochem, M. D.	Farm Bureau, Columbus, Ohio
Arthur W. Young, M. D.	Sun, Montreal, Canada
George G. Young, M. D.	Central, Des Moines, Iowa
Victor H. Young, M. D.	Travelers, Hartford, Conn.
Russell W. Zinkann, M. D.	Mutual, Waterloo, Canada
Arthur R. Zintek, M. D.	Northwestern Mutual, Milwaukee, Wis.
Albert F. Zipf, M. D.	Calif.-Western States, Sacramento, Calif.

## HONORARY MEMBERS

Francis R. Dieuaide, M. D.	New York City
Arthur Hunter	New York City
Edward E. Rhodes	Newark, N. J.

## EMERITUS MEMBERS

John W. Abbott, M. D.	Worcester, Mass.
Edwin H. Allen, M. D.	Boston, Mass.
Hiram H. Amiral, M. D.	Worcester, Mass.
William B. Bartlett, M. D.	Boston, Mass.
Edgar W. Beckwith, M. D.	New York City
Chester T. Brown, M. D.	Newark, N. J.
O. M. Eakins, M. D.	Pittsburgh, Pa.
Frank Harnden, M. D.	Pittsfield, Mass.
Byam Hollings, M. D.	Boston, Mass.
Walter A. Jaquith, M. D.	Columbus, Ohio
Albert E. Johann, M. D.	Des Moines, Iowa
Francis H. McCrudden, M. D.	Boston, Mass.
William Muhlberg, M. D.	Cincinnati, Ohio
Herbert Old, M. D.	Philadelphia, Pa.
George P. Paul, M. D.	Hartford, Conn.
Charles B. Piper, M. D.	Hartford, Conn.
James M. H. Rowland, M. D.	Baltimore, Md.
Robert L. Rowley, M. D.	Hartford, Conn.
H. Crawford Scadding, M. D.	Toronto, Canada
Ernest W. Scott, M. D.	New York City
Samuel J. Streight, M. D.	Toronto, Canada
Bion C. Syverson, M. D.	New York City
Walter E. Thornton, M. D.	Fort Wayne, Ind.
William R. Ward, M. D.	Newark, N. J.
Fred L. Wells, M. D.	Des Moines, Iowa
Chester F. S. Whitney, M. D.	New York City
McLeod C. Wilson, M. D.	Hartford, Conn.

## COMPANIES AND THEIR REPRESENTATIVES

Acacia Mutual Life Insurance Co., Washington, D. C.	{ J. R. B. Hutchinson, M. D. J. B. Nichols, M. D.
Aetna Life Insurance Co., Hartford, Conn.	{ K. F. Brandon, M. D. J. G. Irving, M. D. M. H. Neill, M. D. J. K. T. Ormrod, M. D. H. M. Stevenson, M. D. L. Q. Stewart, M. D.
Alliance Nationale, Montreal, Canada	Bernard Baillargeon, M. D.
All American Assurance Co., Lafayette, La.	Paul Kurzweg, Jr., M. D.
All States Life Insurance Co., Montgomery, Ala.	Bernard Mount, M. D.
American General Life Insurance Co., Houston, Tex.	Ghent Graves, M. D.
American Life Insurance Co., Birmingham, Ala.	Cabot Lull, M. D.
American Mutual Life Insurance Co., Des Moines, Iowa.	{ E. B. Mountain, M. D. V. C. Robinson, M. D.
American National Insurance Co., Galveston, Tex.	D. P. Wall, M. D.
American Reserve Life Insurance Co., Omaha, Neb.	R. A. Moser, M. D.
Asahi Mutual Life Insurance Company, Tokyo, Japan	Tsugitake Isshiki, M. D.
Atlantic Life Insurance Co., Richmond, Va.	Cullen Pitt, M. D.

# COMPANIES AND THEIR REPRESENTATIVES 301

Australian Mutual Provident Society, Sydney, Australia.	{ J. H. Halliday, M. D. S. A. Smith, M. D.
Baltimore Life Insurance Co., Baltimore, Md.	N. B. Cole, M. D.
Bankers Life Company, Des Moines, Iowa.	{ F. T. Hallam, M. D. G. I. Hull, M. D. George McCreight, M. D.
Bankers Life Insurance Co. of Nebraska, Lincoln, Neb.	{ D. A. Campbell, M. D. H. E. Flansburg, M. D.
Bankers National Life Ins. Co., Montclair, N. J.	B. T. D. Schwarz, M. D.
Berkshire Life Insurance Co., Pittsfield, Mass.	F. R. Congdon, M. D.
Boston Mutual Life Insurance Co., Boston, Mass.	L. B. Ellis, M. D.
Business Men's Assurance Co. of America, Kansas City, Mo.	C. B. Ahlefeld, M. D.
Calif.-Western States Life Insurance Co., Sacramento, Calif.	A. F. Zipf, M. D.
Canada Life Assurance Co., Toronto, Canada.	{ A. E. Parks, M. D. R. S. A. Purkis, M. D. J. C. Sinclair, M. D.
Capitol Life Insurance Co. of Colorado, Denver, Colo.	J. M. Foster, M. D.
Carolina Life Insurance Co., Columbia, S. C.	C. G. Spivey, M. D.
Central Life Assurance Society, Des Moines, Iowa.	{ M. I. Olsen, M. D. G. G. Young, M. D.
Central Standard Life Ins. Co., Monmouth, Ill.	H. G. Ebersole, M. D.

Colonial Life Insurance Co., East Orange, N. J.	L. A. Pyle, M. D.
Columbian Mutual Life Ins. Co., Binghamton, N. Y.	{ W. B. Aten, M. D. R. W. Peterson, M. D.
Columbian Mutual Life Ins. Co., Memphis, Tenn.	J. P. Moss, M. D.
Columbian National Life Ins. Co., Boston, Mass.	{ C. H. Kelley, M. D. F. L. Springer, M. D.
Columbus Mutual Life Ins. Co., Columbus, Ohio.	F. M. Green, M. D.
Commonwealth Life Insurance Co., Louisville, Ky.	A. S. Irving, M. D.
Companhia Internacional De Seguros, Rio de Janeiro, Brazil	Luiz Murgel, M. D.
Companion Life Ins. Co., New York City	Joseph Altman, M. D.
Confederation Life Association, Toronto, Canada.	{ C. D. Gossage, M. D. G. W. Loughheed, M. D.
Connecticut General Life Ins. Co., Hartford, Conn.	{ N. J. Barker, M. D. L. H. Earle, Jr., M. D. O. G. Goldkamp, M. D. C. J. M. Grisdale, M. D. J. D. McGaughey, III, M. D. A. J. Robinson, M. D. S. C. Trent, M. D. K. E. Ward, M. D. A. C. Wilson, M. D.
Connecticut Mutual Life Ins. Co., Hartford, Conn.	{ T. M. Ebers, M. D. H. F. Laramore, M. D. R. E. Nicholson, M. D. D. S. Pepper, M. D. H. B. Rollins, M. D.
Constitution Life Company of America, Los Angeles, Calif.	W. E. Branch, M. D.

# COMPANIES AND THEIR REPRESENTATIVES 303

Continental Amer. Life Ins. Co., Wilmington, Del.	W. M. Genthner, M. D.
Continental Assurance Co., Chicago, Ill.	{ H. W. Dingman, M. D. C. L. Reeder, M. D.
Continental Life Insurance Co., Toronto, Canada.	S. J. N. Magwood, M. D.
Country Life Insurance Co., Chicago, Ill.	J. E. Boland, M. D.
Crown Life Insurance Co., Toronto, Canada.	{ H. D. Delamere, M. D. F. D. Truax, M. D.
Dominion Life Assurance Co., Waterloo, Canada	{ A. J. McGanity, M. D. H. M. Pequegnat, M. D.
Eastern Life Insurance Co., New York City	Isaac Sossnitz, M. D.
Empire Life and Accident In- surance Co., Indianapolis, Ind.	J. M. Leffel, M. D.
Empire Life Insurance Co., Kingston, Canada	J. S. Delahaye, M. D.
Empire State Mutual Life In- surance Co., Jamestown, N. Y.	C. L. Wilson, M. D.
Equitable Life Assurance Society, New York City	{ Leslie Brown, M. D. R. B. Cleveland, M. D. George Goodkin, M. D. R. S. Gubner, M. D. N. C. Kiefer, M. D. W. C. Lamb, M. D. W. J. McNamara, M. D. W. M. Reynolds, M. D. W. A. Smith, M. D. H. E. Ungerleider, M. D.
Equitable Life Insurance Co. Washington, D. C.	F. M. McChesney, M. D.

Equitable Life Ins. Co. of Canada, Waterloo, Canada	P. G. Schwager, M. D.
Equitable Life Insurance Co. of Iowa, Des Moines, Iowa.	{ W. O. Purdy, M. D. R. R. Simmons, M. D.
Excelsior Life Insurance Co., Toronto, Canada.	M. H. Henderson, M. D. B. W. Vale, M. D.
Family Fund Life Insurance Company, Atlanta, Ga.	Richard King, M. D.
Farm Bureau Life Ins. Co., Columbus, Ohio.	D. E. Yochem, M. D.
Farmers & Bankers Life Insur- ance Co., Wichita, Kan.	C. D. McKeown, M. D.
Federal Life and Casualty Company, Battle Creek, Mich.	A. A. Humphrey, M. D.
Fidelity Life Assurance Co., Regina, Canada	F. D. Munroe, M. D.
Fidelity Mutual Life Ins. Co., Philadelphia, Pa.	{ J. M. Peck, M. D. J. T. Sheridan, M. D. L. S. Ylvisaker, M. D.
Fidelity Union Life Insurance Co., Dallas, Tex.	J. T. Downs, Jr., M. D.
Franklin Life Ins. Co., Springfield, Ill.	W. A. Henry, M. D. W. F. H. O'Neill, M. D.
General American Life Ins. Co., St. Louis, Mo.	J. H. Ready, M. D.
Great American Reserve In- surance Co., Dallas, Tex.	G. K. Wallace, M. D.
Great National Life Insurance Co., Dallas, Tex.	P. M. Rattan, M. D.



# COMPANIES AND THEIR REPRESENTATIVES 305

Great-West Life Assur. Co., Winnipeg, Canada.	{ A. B. Houston, M. D. F. A. L. Mathewson, M. D. F. H. Smith, M. D.
Guarantee Mutual Life Insurance Co., Omaha, Neb.	J. P. Donelan, M. D.
Guaranty Income Life Insurance Co., Baton Rouge, La.	H. G. Riche, M. D.
Guardian Life Insurance Co. of America, New York City	{ M. B. Bender, M. D. Phillips Lambkin, M. D. D. C. Roberts, M. D.
Gulf Life Insurance Co., Jacksonville, Fla.	J. A. Wilhelm, M. D.
Hawaiian Life Insurance Co., Ltd., Honolulu, T. H.	C. E. Fronk, M. D.
Home Beneficial Life Insurance Company, Inc., Richmond, Va.	H. M. Goodman, M. D.
Home Friendly Insurance Co., Baltimore, Md.	M. Theodore Boss, M. D.
Home Life Insurance Co., New York City	{ J. H. Humphries, M. D. V. L. Karren, M. D. G. E. Woodford, M. D.
Home Life Ins. Co. of America, Philadelphia, Pa.	H. W. Goos, M. D.
Home State Life Insurance Co., Oklahoma City, Okla.	W. W. Rucks, M. D.
Imperial Life Assurance Co., Toronto, Canada.	J. C. Emmett, M. D. D. L. Selby, M. D.
Independent Order of Foresters, Toronto, Canada	C. B. Parker, M. D.

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Indianapolis Life Ins. Co., Indianapolis, Ind.	R. M. Nay, M. D.
Industrial Life Insurance Co., Quebec, Canada	Maurice Turcotte, M. D.
Interstate Life and Accident Co., Chattanooga, Tenn.	J. W. Johnson, Jr., M. D.
Jefferson National Life Insurance Co., Indianapolis, Ind.	D. J. Wolfram, M. D.
Jefferson Standard Life Ins. Co., Greensboro, N. C.	{ V. W. Gunter, M. D. H. F. Starr, M. D.
John Hancock Mutual Life Ins. Co., Boston, Mass.	{ R. A. Behrman, M. D. R. L. Candage, M. D. B. L. Huntington, M. D. F. J. Kefferstan, II, M. D. J. S. Pearson, M. D. J. L. Tansey, M. D. F. A. Warner, M. D.
Kansas City Life Ins. Co., Kansas City, Mo.	{ G. P. Barnett, M. D. J. E. Bee, M. D.
Kentucky Home Mutual Life Insurance Co., Louisville, Ky.	F. M. Stites, M. D.
Knights of Columbus, New Haven, Conn.	G. J. Lunz, M. D.
"La Latino-Americana", Mexico, D. F.	Ignacio Mesa, M. D.
La Nacional, Compania de Seguros Sobre la Vida, S. A., Mexico, D. F.	Aniceto Del Rio, M. D.
Liberty Life Insurance Co., Greenville, S. C.	W. S. Fewell, M. D.
Liberty National Life Ins. Co., Birmingham, Ala.	{ J. A. Livingston, M. D. R. C. Secor, M. D.

# COMPANIES AND THEIR REPRESENTATIVES 307

Life & Casualty Ins. Co. of Tennessee, Nashville, Tenn.	C. T. Kirchmaier, M. D.
Life Insurance Co. of Georgia, Atlanta, Ga.	O. E. Hanes, M. D.
Life Insurance Co. of Virginia, Richmond, Va.	{ G. M. Harwood, M. D. H. M. McCue, Jr., M. D. E. S. Williams, M. D.
Lincoln Liberty Life Ins. Co., Lincoln, Neb.	G. H. Walker, M. D.
Lincoln National Life Ins. Co., Fort Wayne, Ind.	{ H. A. Cochran, Jr., M. D. I. K. Gardner, M. D. G. M. Graham, M. D. J. L. Humphreys, M. D. W. H. Scoins, M. D.
London Life Insurance Co., London, Canada.	{ J. T. Bowman, M. D. G. R. Collyer, M. D. A. S. Graham, M. D.
Loyal Protective Life Insur- ance Co., Boston, Mass.	H. W. Hudson, M. D.
Lutheran Brotherhood, Minneapolis, Minn.	H. J. Brekke, M. D.
Maccabees (The), Detroit, Mich.	H. R. John, M. D.
Manhattan Life Insurance Co., New York City	{ G. H. Barber, M. D. L. G. LaPointe, M. D.
Manufacturers Life Ins. Co., Toronto, Canada.	{ D. J. Breithaupt, M. D. T. C. Dunlop, M. D. H. M. Gray, M. D. R. C. Montgomery, M. D.
Maritime Life Insurance Co., Halifax, Canada	G. H. Murphy, M. D.

Massachusetts Mutual Life Insurance Co., Springfield, Mass.	{ H. B. Brown, M. D. J. R. E. Morden, M. D. Gordon Ross, M. D. T. S. Sexton, M. D.
Metropolitan Life Insurance Co., New York City	{ Henry Almond, M. D. E. F. Beach, Ph. D. D. M. Benford, M. D. R. A. Benson, M. D. C. C. Berwick, M. D. E. C. Bonnett, M. D. A. W. Bromer, M. D. E. T. Dewey, M. D. R. K. Farnham, M. D. H. H. Fellows, M. D. R. W. Finegan, M. D. J. T. Geiger, M. D. J. C. Horan, M. D. A. O. Jimenis, M. D. H. B. Kidd, M. D. W. J. McConnell, M. D. G. S. Pesquera, M. D. G. P. Robb, M. D. K. J. Thomson, M. D. Wallace Troup, M. D.
Michigan Life Insurance Co., Detroit, Mich.	R. J. Scott, M. D.
Midland Mutual Life Insur- ance Co., Columbus, Ohio	P. H. Charlton, M. D.
Midland National Life Insur- ance Co., Watertown, S. D.	O. S. Randall, M. D.
Midwest Life Insurance Co., Lincoln, Neb.	E. W. Rowe, M. D.
Minnesota Mutual Life Insur- ance Co., St. Paul, Minn.	A. E. Venables, M. D.

## COMPANIES AND THEIR REPRESENTATIVES 309

Missouri Insurance Co., St. Louis, Mo.	C. D. Magee, M. D.
Modern Woodmen of America, Rock Island, Ill.	E. A. Anderson, M. D.
Monarch Life Assur. Co., Winnipeg, Canada	J. P. Gemmell, M. D.
Monarch Life Insurance Co., Springfield, Mass.	{ L. E. Hathaway, Jr., M. D. H. N. Simpson, M. D.
Montreal Life Insurance Co., Montreal, Canada	R. V. Ward, M. D.
Monumental Life Insurance Co., Baltimore, Md.	F. H. Vinup, M. D.
Mutual Benefit Life Insurance Co., Newark, N. J.	{ J. R. Beard, M. D. E. C. Hillman, Jr., M. D. W. A. Reiter, M. D. M. T. Ryman, M. D. D. F. Steuart, M. D. Jefferson Weed, M. D.
Mutual Life Assur. Co. of Canada, Waterloo, Canada	{ J. G. Ross, M. D. R. W. Zinkann, M. D.
Mutual Life Ins. Co. of New York, New York City	{ J. R. Gudger, M. D. T. J. McGurl, Jr., M. D. J. F. Moore, Jr., M. D. S. A. Narins, M. D. T. E. Plucinski, M. D. A. A. Pollack, M. D. R. L. Willis, M. D.
Mutual Trust Life Insurance Co., Chicago, Ill.	A. A. Willander, M. D.
National Equity Life Insur- ance Co., Little Rock, Ark.	Alfred Kahn, Jr., M. D.

- National Guardian Life Insurance Co., Madison, Wis. A. R. Tormey, M. D.
- National Life & Accident Ins. Co., Nashville, Tenn. { B. F. Byrd, M. D.  
G. E. Fort, M. D.  
L. C. Miller, M. D.
- National Life Assurance Co. of Canada, Toronto, Canada E. C. Noble, M. D.
- National Life Co., Des Moines, Iowa L. K. Meredith, M. D.
- National Life Insurance Co., Montpelier, Vt. { H. L. Colombo, M. D.  
J. L. Saia, M. D.
- National Old Line Insurance Co., Little Rock, Ark. R. E. McLochlin, M. D.
- National Reserve Life Insurance Co., Sioux Falls, S. D. Rezin Reagan, M. D.
- New England Mutual Life Ins. Co., Boston, Mass. { F. R. Brown, M. D.  
M. H. Clifford, M. D.  
O. C. Hendrix, M. D.  
W. F. Ketchum, M. D.  
R. B. Singer, M. D.
- New York Life Insurance Co., New York City { D. R. Auten, M. D.  
M. F. Bell, M. D.  
William Bolt, M. D.  
E. J. Campbell, M. D.  
G. D. Dorman, M. D.  
A. H. Faber, M. D.  
E. M. Freeland, M. D.  
E. E. Getman, M. D.  
H. L. Hauge, M. D.  
T. B. Hoxie, M. D.  
J. J. Hutchinson, M. D.  
I. C. Lawler, M. D.  
John Malgieri, M. D.  
D. J. O'Leary, M. D.  
R. W. Pratt, M. D.  
L. J. Tedesco, M. D.

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North American Life Assur. Co., Toronto, Canada	{ J. G. Falconer, M. D. Eugene Montgomery, M. D.
North American Reassurance Co., New York City	E. V. Higgins, M. D.
Northern Life Assurance Co. of Canada, London, Canada	J. H. Geddes, M. D.
Northwestern Mutual Life Ins. Co., Milwaukee, Wis.	{ R. W. Benton, M. D. J. M. Bond, M. D. J. A. End, M. D. D. F. Ridders, M. D. G. F. Tegtmeyer, M. D. A. R. Zintek, M. D.
Northwestern National Life Ins. Co., Minneapolis, Minn.	K. W. Anderson, M. D.
Norwich Union Life Insurance Society, Toronto, Canada	W. B. Thornton, M. D.
Occidental Life Ins. Co. of California, Los Angeles, Calif.	{ E. F. Sheldon, M. D. Joseph Travenick, Jr., M. D.
Ohio National Life Ins. Co., Cincinnati, Ohio	{ H. H. Shook, M. D. B. W. Sitterson, M. D.
Ohio State Life Insurance Co., Columbus, Ohio	T. F. Ross, M. D.
Old Line Life Insurance Co. of America, Milwaukee, Wis.	{ H. M. Hawkins, M. D. R. D. O'Connor, M. D.
Oriental Government Security Life Assurance Co., Ltd., Bombay, India.	K. J. J. Cursetji, M. D.
Pacific Mutual Life Ins. Co., Los Angeles, Calif.	{ F. R. Anderson, M. D. L. H. Lee, M. D. J. C. Talbot, M. D.

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Pan-American Life Ins. Co., New Orleans, La.	{ Marion Souchon, M. D. R. C. Voss, M. D.
Paul Revere Life Ins. Co., Worcester, Mass.	{ H. R. Leffingwell, M. D. J. K. Ruggles, Jr., M. D.
Peninsular Life Insurance Co., Jacksonville, Fla.	E. B. Milam, M. D.
Penn Mutual Life Ins. Co., Philadelphia, Pa.	{ J. R. Bowen, M. D. B. A. Dawber, M. D. E. S. Dillon, M. D. D. W. Hoare, M. D. W. R. Leute, Jr., M. D. R. L. Weaver, M. D.
Pennsylvania Life, Health & Accident Ins. Co., Philadelphia, Pa.	John P. Chapman, M. D.
Peoples Life Insurance Co., Washington, D. C.	M. A. Puzak, M. D.
Philadelphia Life Ins. Co., Philadelphia, Pa.	T. M. Armstrong, M. D.
Phoenix Mutual Life Ins. Co., Hartford, Conn.	{ H. B. Campbell, M. D. R. A. Goodell, M. D. Llewellyn Hall, M. D. N. R. Kelley, M. D.
Pilot Life Insurance Co., Greensboro, N. C.	J. L. Cook, M. D.
Pioneer Mutual Life Insurance Co., Fargo, N. D.	F. O. Gronvold, M. D.
Postal Life Insurance Co., New York City	L. B. Dunn, M. D.
Preferred Life Assurance Society, Montgomery, Ala.	B. C. Bird, M. D.



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Protected Home Circle, Sharon, Pa.	W. G. McLaughry, M. D.
Protective Life Insurance Co., Birmingham, Ala.	E. G. Givhan, Jr., M. D.
Provident Life and Accident Ins. Co., Chattanooga, Tenn.	W. R. Bishop, M. D.
Provident Mutual Life Ins. Co., Philadelphia, Pa.	{ E. J. Dewees, M. D. P. H. Langner, Jr., M. D. L. L. McLellan, M. D. S. R. Moore, M. D.
Prudential Assur. Co., Ltd., Montreal, Canada	{ E. S. Mills, M. D. C. A. Peters, M. D.
Prudential Insurance Co. of America, Newark, N. J.	{ S. F. Bassett, M. D. R. F. Buchan, M. D. E. G. Dewis, M. D. A. H. Domm, M. D. R. L. Dross, M. D. R. E. Funke, M. D. F. I. Ganot, M. D. A. E. Gras, M. D. W. C. Hausheer, M. D. E. G. Howe, M. D. E. A. Keenleyside, M. D. C. E. Kiessling, M. D. H. B. Kirkland, M. D. N. L. Knott, M. D. J. C. Lindner, M. D. F. J. McGurl, M. D. R. A. Nelson, M. D. A. J. Oberlander, M. D. W. C. Page, M. D. P. V. Reinartz, M. D. R. S. Schaaf, M. D. K. F. Schaefer, M. D.
Puritan Life Insurance Co., Providence, R. I.	E. D. Chesebro, M. D.

314 SIXTY-SECOND ANNUAL MEETING

Pyramid Life Insurance Co., Little Rock, Ark.	J. H. Sanderlin, M. D.
Republic National Life Ins. Co., Dallas, Tex.	{ J. E. Hunsinger, M. D. D. G. Kilgore, M. D.
Reserve Life Insurance Co., Dallas, Tex.	D. W. Carter, Jr., M. D.
Rockford Life Insurance Co., Rockford, Ill.	P. A. Anderson, M. D.
Royal Insurance Co., Ltd., Montreal, Canada	G. W. Halpenny, M. D.
Security Benefit Life Ins. Co., Topeka, Kan.	F. R. Stearns, M. D.
Security Life and Accident Co., Denver, Colo.	{ D. S. Baughman, M. D. R. C. Scannell, M. D.
Security Life & Trust Co., Winston-Salem, N. C.	S. W. Hurdle, M. D.
Security Mutual Life Ins. Co., Binghamton, N. Y.	V. G. Hammond, M. D.
Shenandoah Life Insurance Co., Inc., Roanoke, Va.	D. S. Garner, M. D.
Southern Life Insurance Co. of Georgia, Atlanta, Ga.	D. Y. Sage, M. D.
Southland Life Insurance Co., Dallas, Tex.	Hall Shannon, M. D.
Southwestern Life Ins. Co., Dallas, Tex.	C. F. Brown, M. D.
Sovereign Life Assurance Co., Winnipeg, Canada	C. P. Neilson, M. D.

# COMPANIES AND THEIR REPRESENTATIVES 315

Standard Insurance Company, Portland, Ore.	E. L. Boylen, M. D.
Standard Life Association, Lawrence, Kan.	G. D. Townshend, M. D.
Standard Life Assur. Co., Montreal, Canada	W. W. Eakin, M. D.
State Farm Life Insurance Co., Bloomington, Ill.	E. M. Stevenson, M. D.
State Mutual Life Assur. Co., Worcester, Mass.	{ C. C. Beach, M. D. F. P. Bicknell, M. D. R. D. Brewer, Jr., M. D.
State Reserve Life Insurance Co., Fort Worth, Tex.	Samuel Jagoda, M. D.
Sun Life Assurance Company of Canada, Montreal, Canada	{ J. K. Gordon, M. D. D. H. Woodhouse, M. D. A. W. Young, M. D.
Sun Life Insurance Co. of America, Baltimore, Md.	George McLean, M. D.
Sunset Life Insurance Co. of America, Olympia, Wash.	J. E. Toothaker, M. D.
Teachers Insurance & Annuity Association, New York City	William MacDonald, M. D.
T. Eaton Life Assurance Co., Toronto, Canada	C. V. Mulligan, M. D.
Texas Life Insurance Co., Waco, Tex.	I. E. Colgin, M. D.
Texas Prudential Insurance Co., Galveston, Tex.	E. R. Thompson, M. D.
Toronto Mutual Life Ins. Co., Toronto, Canada	J. A. A. Harcourt, M. D.

Travelers Insurance Company, Hartford, Conn.	{ J. T. Cabaniss, M. D. R. M. Filson, M. D. A. L. Larson, M. D. J. C. Robinson, M. D. A. F. Seibert, M. D. Euen Van Kleeck, M. D. V. H. Young, M. D.
Union Central Life Insurance Co., Cincinnati, Ohio	{ W. D. Hickerson, M. D. Edward Kuck, M. D. Charles Maertz, M. D.
Union Labor Life Insurance Co., New York City	W. L. O'Connell, M. D.
Union Life Insurance Co., Little Rock, Ark.	J. H. Hayes, M. D.
Union Mutual Life Insurance Co., Portland, Me.	H. E. Christensen, M. D.
United Benefit Life Insurance Co., Omaha, Neb.	N. L. Criss, M. D.
United Fidelity Life Insurance Co., Dallas, Tex.	H. K. Crutcher, M. D.
United Life and Accident Ins. Co., Concord, N. H.	{ H. H. Amsden, M. D. P. M. L. Forsberg, M. D.
United Life Insurance Co., Jacksonville, Fla.	J. F. Lovejoy, M. D.
United States Life Ins. Co., New York City	C. M. Bonzey, Jr., M. D.
Victory Life Insurance Co., Topeka, Kan.	M. B. Miller, M. D.
Volunteer State Life Ins. Co., Chattanooga, Tenn.	J. B. Steele, M. D.
Washington National Insur- ance Company, Evanston, Ill.	P. C. Waldo, M. D.

## COMPANIES AND THEIR REPRESENTATIVES 317

West Coast Life Ins. Co., San Francisco, Calif.	I. C. Heron, M. D.
Western Life Assurance Company, Hamilton, Canada	G. E. Greenway, M. D.
Western Life Insurance Company, Helena, Mont.	{ T. L. Hawkins, M. D. E. H. Lindstrom, M. D.
Western and Southern Life Ins. Co., Cincinnati, Ohio	{ C. M. Barrett, M. D. M. W. Gwinner, M. D. F. A. Snyder, M. D.
Western States Life Insurance Company, Fargo, N. D.	T. H. Lewis, M. D.
Wisconsin Life Insurance Company, Madison, Wis.	G. G. Stebbins, M. D.
Wisconsin National Life Insurance Company, Oshkosh, Wis.	E. B. Williams, M. D.
Woodmen of the World Life Insurance Society, Omaha, Neb.	H. B. Kennedy, M. D.

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